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Quaternary Fault and Fold Database of the United States

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Beaverhead fault, Leadore section (Class A) No. 603c

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 603c, Beaverhead fault, Leadore 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	**General:** Although Beaverhead fault was mapped and discussed

comments	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 Leadore segment by Haller (1988 #27). This section extends from west of Jakes Canyon southward to near Eighteenmile Creek. It includes the Canyon Creek and Hawley Creek segments in Montana Bureau of Mines and Geology digital database (Stickney, written commun., 1992) and Hawley Creek scarp of Stickney and Bartholomew (1987 #85). **Fault ID:** Refers to number 112 ("unnamed fault") in Witkind (1975 #320).
County(s) and State(s)	LEMHI COUNTY, IDAHO
Physiographic province(s)	NORTHERN ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:24,000 scale. *Comments:* Location of the scarps is 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 1:24,000. 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	N52°W (for section) versus N39°W (for whole fault)
Sense of movement	Normal
Dip Direction	SW
Paleoseismology studies	
Geomorphic expression	Section spans major embayment in range front and is characterized by generally continuous, morphologically young scarps on alluvium. Grabens are well preserved and are as much as 0.3-km wide (Haller, 1988 #27; Crone and Haller, 1991 #186).
Age of faulted surficial deposits	Scarps are formed on all but late Holocene alluvial deposits.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* The morphologies of probable single-event fault scarps indicates a middle Holocene age for most recent faulting event. Probable multiple-event scarps are thought to be less than approximately 30 ka (Haller, 1988 #27). Stickney and Bartholomew (1987 #85) state that the scarps on this section of fault (called Hawley Creek scarp) are poorly preserved on late Pleistocene(?) deposits and are probably older than age cited in this compilation.
Recurrence interval	*Comments:* The interval between the two most recent events of about 15-25 k.y. is suggested by Haller's (1988 #27) estimate of two events in past 30 k.y. with the most recent event occurring in the middle Holocene.
Slip-rate category	Less than 0.2 mm/yr *Comments:* Scott and others (1985 #76) suggested a slip rate of 0.3 mm/yr for central part of Beaverhead fault based on an analogy with the central part of the Lost River fault [601] along which 4 m of offset has occurred in the past 15 k.y. More recent, fault specific geomorphic studies suggest that the slip rate for this

	part of the Beaverhead fault is lower. Profiles of scarps at six sites on two of the central segments of the fault (Haller, 1988 #27) on early Pinedale-equivalent (25-30 ka) surfaces show vertical surface offsets that range from 2.4-3.5 m, which formed during several earthquakes. This amount of offset suggests a slip rate that would be much less than 0.2 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. #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. #85 Stickney, M.C., and Bartholomew, M.J., 1987, Seismicity and late Quaternary faulting of the northern Basin and Range province, Montana and Idaho: Bulletin of the Seismological Society of America, v. 77, p. 1602-1625.

	#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.