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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.

Post-Lava Creek faults in NW Yellowstone National Park (Class A) No. 747

Last Review Date: 1998-03-31

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Synopsis	Outside the northwest quadrant of the 0.63 Ma Yellowstone caldera there are 20 or more faults that offset 0.63-Ma Lava Creek Tuff or are related to faults that do. These faults generally have less than 50 m of offset in the late and middle Quaternary, and consequently have low long-term slip rates. These faults trend north except in the area near West Yellowstone basin, where they trend north to northwest subparallel to the eastern end of the Red Canyon fault [657]. Many of these faults are within the Norris-Mammoth corridor (White and others, 1988 #3797; Pierce and others, 1991 #1055). These faults may relate to volcanism and magmatism associated with the Yellowstone caldera, which erupted catastrophically about 0.63 Ma. Several faults that could be considered to be within this group show evidence of post-glacial movement, but they are described separately as the Wolf Lake fault [752].

Name comments	Includes more than 20 faults in the northwest part of Yellowstone National Park that offset the 0.63-Ma Lava Creek Tuff or are related to faults that do. However, the East Gallatin-Reese Creek fault system [746] and the Red Canyon fault [657] are described separately herein.
County(s) and State(s)	GALLATIN COUNTY, MONTANA TETON COUNTY, WYOMING PARK COUNTY, WYOMING
Physiographic province(s)	MIDDLE ROCKY MOUNTAINS NORTHERN ROCKY MOUNTAINS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Faulting of late Cenozoic volcanic rocks was mapped at 1:125,000 scale (Christiansen, 2001 #1784) and at 1:62,500 scale (unpublished map of Mammoth quadrangle by Christiansen and others; Christiansen and Blank, 1974 #2264; Christiansen and Blank, 1974 #2265; Prostka and others, 1975 #2260). Ruppel(1972 #470) mapped pre-Eocene rocks in the area. Fault traces were recompiled at 1:125,000-scale on map with topographic base.
Geologic setting	These Quaternary faults northwest of the 0.63 Ma Yellowstone Caldera have a northerly to northwesterly strike, offset Lava Creek Tuff, and may be associated with post-caldera activity.
Length (km)	49 km.
Average strike	N23°W
Sense of movement	Normal
Dip Direction	NE; SW
Paleoseismology studies	
Geomorphic expression	The faults are generally expressed as escarpments on or valleys in Lava Creek Tuff (bedrock).
Age of faulted surficial	These faults offset the 0.63-Ma Lava Creek Tuff, generally as a result of multiple surface rupturing events. However, mapping of

deposits	the surficial geology (Pierce, 1973 #3804; Pierce, 1973 #3805; Waldrop and Pierce, 1975 #3803) show no post-glacial fault scarps.
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) *Comments:* These faults offset the 0.63-Ma Lava Creek Tuff, generally as a result of multiple surface-rupturing events. Post-glacial scarps have not been generally recognized along the faults, although these faults were not specifically examined for evidence of offset of surficial materials. Part of several other faults that approach the Yellowstone caldera show evidence of post-glacial movement, but they are described separately under the Wolf Lake fault [752].
Recurrence interval	*Comments:* Although undetermined, the minimum recurrence is probably more than 10-15 k.y. because no post-glacial offset has been noted.
Slip-rate category	Less than 0.2 mm/yr *Comments:* A low slip-rate category is assigned on the basis of generally less than 50 m of offset in the past 0.63 Ma.
Date and Compiler(s)	1998 Kenneth L. Pierce, U.S. Geological Survey, Emeritus
References	#1784 Christiansen, R.L., 2001, The Quaternary and Pliocene Yellowstone Plateau volcanic field of Wyoming, Idaho, and Montana: U.S. Geological Survey Professional Paper 729-G, 145 p., 3 pls., scale 1:125,000. #2264 Christiansen, R.L., and Blank, H.R., Jr., 1974, Geologic map of the Old Faithful quadrangle, Yellowstone, National Park, Wyoming: U.S. Geological Survey Geologic quadrangle Map GQ-1189, scale 1:62,500. #2265 Christiansen, R.L., and Blank, H.R., Jr., 1974, Geologic map of the Madison Junction quadrangle, Yellowstone National Park, Wyoming: U.S. Geological Survey Geologic quadrangle Map GQ-1190, scale 1:62,500.

#3804 Pierce, K.L., 1973, Surficial geologic map of the Mammoth quadrangle and part of the Gardiner quadrangle, Yellowstone National Park, Wyoming and Montana: U.S. Geological Survey Miscellaneous Geologic Investigations I-641, 1 sheet, scale 1:62,500.

#3805 Pierce, K.L., 1973, Surficial geologic map of the Mount Holmes quadrangle and parts of the Tepee Creek, Crown Buttes, and Miner quadrangles, Yellowstone National Park, Wyoming and Montana: U.S. Geological Survey Miscellaneous Geologic Investigations I-640, 1 sheet, scale 1:62,500.

#1055 Pierce, K.L., Adams, K.D., and Sturchio, N.C., 1991, Geologic setting of the Corwin Springs Known Geothermal Resources Area-Mammoth Hot Springs Area in and adjacent to Yellowstone National Park, *in* Sorey, M.L., ed., Effects of potential geothermal development in the Corwin Springs Known Geothermal Resources Area, Montana, on the thermal features of Yellowstone National Park: U.S. Geological Survey Water-Resources Investigations Report 91-4052.

#2260 Prostka, H.J., Blank, H.R., Jr., Christiansen, R.L., and Ruppel, E.T., 1975, Geologic map of the Tower Junction quadrangle, Yellowstone National Park, Wyoming and Montana: U.S. Geological Survey Geologic quadrangle Map GQ-1247, scale 1:62,500.

#470 Ruppel, E.T., 1972, Geology of pre-Tertiary rocks in the northern part of Yellowstone National Park, Wyoming: U.S. Geological Survey Professional Paper 729-A, 66 p., 1 pl., scale 1:62,500.

#639 U.S. Geological Survey, 1972, Geologic map of Yellowstone National Park: U.S. Geological Survey Miscellaneous Geologic Investigations I-711, 1 sheet, scale 1:125,000.

#3803 Waldrop, H.A., and Pierce, K.L., 1975, Surficial geologic map of the Madison Junction quadrangle, Yellowstone National Park, Wyoming: U.S. Geological Survey Miscellaneous Geologic Investigations I-651, 1 sheet, scale 1:62,500.

#3797 White, D.E., Hutchinson, R.A., and Keith, T.E.C., 1988, The geology and remarkable thermal activity of Norris Geyser

	Basin, Yellowstone National Park, Wyoming: U.S. Geological Survey Professional Paper 1456, 84 p.