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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.

West Kaibab fault system (Class A) No. 994

Last Review Date: 1997-02-11

Compiled in cooperation with the Arizona Geological Survey

citation for this record: **Pearthree, P.A., compiler, 1997, Fault number 994, West Kaibab fault system, 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 03:11 PM.**

Synopsis	Several large, down-to-the-west normal faults cut the erosion surface formed on Paleozoic rocks along the western flank of the Kaibab Plateau, north of the Grand Canyon. Quaternary deposits are fairly sparse in this area, but deposition has occurred in valleys along the faults. The overall trend of the West Kaibab fault system is north, but individual faults trend north, northwest, and northeast. Along the central and northern parts of the fault system, faulting is expressed as fairly high and steep, west-facing scarps formed in Paleozoic bedrock, with Quaternary deposits in linear valleys along their bases. Quaternary activity is likely on at least some of these faults based on their strong geomorphic expression and possible displacement of Pleistocene colluvium,

	but these relations have not been conclusively demonstrated.
Name comments	Faults mapped and described by Strahler (1948 #2254); faults grouped and included in larger named system by Huntoon (1974 #2176); includes the Muav Canyon, Big Springs, North Road, and Lefevre graben fault sets of Strahler; the geology of most of these faults has not been mapped in detail, but detailed mapping exists for parts of the Big Springs and Muav faults (Billingsley, 1992 #2178).
County(s) and State(s)	COCONINO COUNTY, ARIZONA
Physiographic province(s)	COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Faults mapped at 1:24,000 scale and on 1:130,000-scale aerial photos; the traces were transferred to 1:250,000-scale topographic base map for digitization.
Geologic setting	Major faults cut the erosion surface developed on Paleozoic rocks on the western flank of the Kaibab Plateau, north of the Grand Canyon. Total normal displacement of Paleozoic rocks across the Muav fault is as much as 165 m; across the Big Springs fault, displacement is as much as 350 m (Billingsley, 1992 #2178). Down-to-the-west normal faulting probably represents reactivation of west-dipping reverse faults at the cores of Laramide folds (Huntoon, 1974 #2176).
Length (km)	83 km.
Average strike	N4°W
Sense of movement	Normal *Comments:* Predominantly normal movement is inferred from topographic relations and fault exposures.
Dip	86° *Comments:* This dip was measured on the Muav fault in the Grand Canyon (Billingsley, 1992 #2178).

Paleoseismology studies	
Geomorphic expression	Graben escarpments are high and steep. Alluvial fans and stream valleys containing Quaternary alluvium are common on the western, downthrown sides of these faults, but no displacement of these deposits has been documented.
Age of faulted surficial deposits	Paleozoic, Pleistocene(?) colluvium
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* This timing estimate is not well constrained, but possible faulting of some Quaternary deposits along the Big Springs fault (Billingsley, 1992 #2178) and the strong geomorphic expression of the fault escarpments indicates that Quaternary activity is likely on this fault system, and middle and late Quaternary activity is possible.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* No data exist to determine a slip rate, but a low rate is inferred on the basis of slip rates on other Quaternary faults in the region.
Date and Compiler(s)	1997 Philip A. Pearthree, Arizona Geological Survey
References	#2178 Billingsley, G.H., 1992, Geologic map of the Jumpup Canyon and Big Springs quadrangles, Mohave and Coconino Counties, Arizona: U.S. Geological Survey Miscellaneous Investigations Map I-2290, 1 sheet, scale 1:62,500. #2176 Huntoon, P.W., 1974, The post-Paleozoic structural geology of the eastern Grand Canyon, Arizona, *in* Breed, W.J., and Roat, E.C., eds., Geology of the Grand Canyon: Museum of Northern Arizona, Flagstaff, and the Grand Canyon Natural History Association, p. 82-115.

	#2254 Strahler, A.N., 1948, West Kaibab fault and Kaibab Plateau: Geological Society of America Bulletin, v. 59, p. 513-540.