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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.

Elko fault (Class A) No. 1723

Last Review Date: 2001-03-06

citation for this record: **Anderson, R.E., compiler, 2001, Fault number 1723, Elko fault, 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 02:26 PM.**

Synopsis	The Elko fault consists of strands of northeast-striking, block-bounding faults that are apparently down to the northwest. Several individual faults tend to strike more northerly than the overall zone, creating a crude en echelon pattern. Correlative tuffaceous sedimentary rocks of late Tertiary age (17-6 Ma) are widely exposed on both sides of the faults directly northeast and southwest of Elko, possibly suggesting nominal vertical displacement (throw). Little is known of the geomorphic expression of the Elko fault. In early mapping of faults formed on unconsolidated deposits in the Elko 1?x2? sheet, it was not recognized as a Quaternary fault. However, on the basis of more recent photogeologic reconnaissance, one short (<2 km) trace southwest of Elko is recognized as a northwest-facing scarp of unspecified height formed on a Quaternary deposit or erosion surface. Elsewhere the trace is mapped as juxtaposing Quaternary alluvium against bedrock. No detailed studies have been conducted on the Elko fault.

Name comments	Name from dePolo (1998 #2845) who applied it to a group of generally northeast-striking faults along the southeastern margin of the Humboldt River Valley. The faults extend discontinuously from the northeastern end of the Elko Hills southwest to about Spring Canyon, which is north of Spring Canyon Mountain. There is a 6-km-long gap in the fault trace near Elko, Nevada. **Fault ID:** Referred to as fault EK2 by dePolo (1998 #2845).
County(s) and State(s)	ELKO COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Locations based on reconnaissance photogeologic mapping at 1:250,000 scale by Dohrenwend and others (1991 #286). That map was produced by direct transfer from the photos to 1/2?x1? (100,000 scale) topographic maps enlarged to the scale of the photos. Those maps were, in turn, reduced and recompiled at 1:100,000 scale.
Geologic setting	The Elko fault consists of strands of northeast-striking block-bounding faults that are apparently down to the northwest (Dohrenwend and others, 1991 #286). Individual faults tend to strike more northerly than the overall zone, creating a crude en echelon pattern. The tectonic significance of these faults is uncertain. Correlative tuffaceous sedimentary rocks of late Tertiary age (17-6 Ma) are widely exposed on both sides of the faults directly northeast and southwest of Elko, possibly suggesting nominal throw (Stewart and Carlson, 1978 #3413). The fault along the northwestern base of Grindstone Mountain apparently places Quaternary/Tertiary alluvium down-on-the-northwest against upper Paleozoic rock (Stewart and Carlson, 1978 #3413). According to Dohrenwend and others (1991 #286), the faults juxtapose Quaternary alluvium against bedrock along most of their length.
Length (km)	36 km.
Average strike	N36°E
Sense of	Normal

movement	*Comments:* Not reported, possibly normal.
Dip Direction	NW
Paleoseismology studies	
Geomorphic expression	Little is known of the geomorphic expression of the Elko fault. Barnhard (1985 #428) did not recognize scarps on alluvium, possibly suggesting the fault's weak geomorphic expression. On the basis of photogeologic reconnaissance, Dohrenwend and others (1991 #286) showed one short (<2 km) trace southwest of Elko as a northwest-facing scarp of unspecified height formed on a Quaternary deposit or erosion surface. Elsewhere the trace is shown as juxtaposing Quaternary alluvium against bedrock. Along the northwestern base of Grindstone Mountain, where the fault appears to place Quaternary alluvium against upper Paleozoic rock (Stewart and Carlson, 1978 #3413), it apparently follows a relatively continuous northwest-facing bedrock escarpment. dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 158 m (134-183 m).
Age of faulted surficial deposits	On the basis of photogeologic reconnaissance, Dohrenwend and others (1991 #286) estimated that a short (<2 km) scarp southwest of Elko is formed on deposits or surfaces of Pleistocene (0.01-1.6 Ma) age.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Age assignment is based on Dohrenwend and others (1991 #286) recognition of a scarp on deposits or surfaces of Pleistocene (0.01-1.6 Ma) age.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.288 mm/yr based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate.

	The size of the facets (tens to hundreds of meters, as measured from topographic maps) indicates they are the result of many seismic cycles, and thus the derived slip rate reflects a long-term average. However, the late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggest the slip rate during this period is of a lesser magnitude. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
Date and Compiler(s)	2001 R. Ernest Anderson, U.S. Geological Survey, Emeritus
References	#428 Barnhard, T.P., 1985, Map of fault scarps formed in unconsolidated sediments, Elko 1° x 2° quadrangle, Nevada and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1791, 1 sheet, scale 1:250,000. #2845 dePolo, C.M., 1998, A reconnaissance technique for estimating the slip rate of normal-slip faults in the Great Basin, and application to faults in Nevada, U.S.A.: Reno, University of Nevada, unpublished Ph.D. dissertation, 199 p. #286 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Elko 1° by 2° quadrangle, Nevada and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2179, 1 sheet, scale 1:250,000. #3413 Stewart, J.H., and Carlson, J.E., 1978, Geologic map of Nevada: U.S. Geological Survey, Special Geologic Map, 1, scale 1:500,000.