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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.

Western Diamond Mountains fault zone (Class A) No. 1211

Last Review Date: 2000-10-15

citation for this record: **Redsteer, M.H., Anderson, R.E., and Machette, M.N., compilers, 2000, Fault number 1211, Western Diamond Mountains fault zone, 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 02:17 PM.**

Synopsis	The Western Diamond Mountains fault zone is marked by an abrupt transition between the very gentle alluvial floor of Diamond Valley and the steep west-facing bedrock escarpment of the Diamond Mountains. The northern part of the fault has little late Quaternary expression, being mainly concealed beneath alluvial and possible lacustrine beds. To the south, the fault is marked by a series of linear down-to the west scarps, which curve to the west and splay out, from Cottonwood Creek to north of Eureka, Nevada. The southern end of the fault zone is characterized by a broad zone of down-to-the-northwest scarps that are approximately 5 km wide. Reconnaissance geologic mapping, photogeologic mapping, and limited analysis of scarp morphology are the sources of data for faults in the Western

	Diamond Mountains zone. Trench investigations of the fault have not been completed.
Name comments	Refers to the Western Diamond Mountains fault zone of dePolo (1998 #2845), which was also mapped as a Quaternary fault by Nolan and others (1971 #4342) and by Dohrenwend and others (1991 #2480). The fault zone extends along the entire western front of the Diamond Mountains, with its northernmost extent being near the Elko County line (dePolo, 1998 #2845). South of Cottonwood Creek, the fault bifurcates into two splays, the eastern splay continues along the range front through Eureka, Nevada, and the western splay curves westward out onto the valley floor and terminates about 7 km northwest of Eureka, Nevada. **Fault ID:** Refers to fault EY1 of dePolo (1998 #2845).
County(s) and State(s)	EUREKA COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Poor Compiled at 1:100,000 scale. *Comments:* Location of northern part of the fault is based on a small-scale map of dePolo (1998 #2845). In general, the fault's trace from between Walters and Threemile Canyons to the north end of the Diamond Mountains was placed at the conspicuous break in slope at the western base of the range as seen on 1:100,000 scale topographic sheets. Thus, although digitized from 1:100,000 scale maps, the trace is considered to be poorly located, since it is mainly concealed. Location of southern part of the fault based on 1:250,000-scale map of Dohrenwend and others (1992 #2480) based on photogeologic analysis of primarily 1:24,000-scale color aerial photography supplemented with 1:60,000-scale black-and-white aerial photography, transferred by inspection to 1:62,500-scale topographic maps and photographically reduced and directly transferred to 1:250,000-scale topographic maps, and subsequent mapping by photogeologic analysis of 1:58,000-nominal-scale color-infrared photography transferred directly to 1:100,000-scale topographic quadrangle maps enlarged to scale of the photographs.

Geologic setting	The Western Diamond Mountains fault is a major down-to-the-west range-front fault that separates the Diamond Mountains on the east from the basin beneath Diamond Valley on the west. Paleozoic bedrock is exposed in the Diamond Mountains by uplift along the Western Diamond Mountains fault. This bedrock is older to the west (Silurian through Cambrian) and younger to the east (Mississippian and Pennsylvanian), being folded and cut by several thrust faults. Cretaceous rocks include freshwater strata deposited in belts within Paleozoic synforms. Landslide megabreccias composed of these Cretaceous rocks may have been produced during later deformation (Nolan and others, 1971 #4342). Tertiary rocks include andesite and ash-flow tuff that are of possible Eocene to Oligocene age. At the southern end of the Western Diamond Mountains fault zone, where the fault splays curves westward, the exposed rocks are distinct from others in the Diamond Mountains, and thought to represent concealed bedrock of the Diamond Valley (Nolan and others, 1971 #4342). This uplifted east-west-trending range, located south of Eureka, is atypical of the usual north-south Basin and Range extensional faulting, and links the Diamond Mountains to the Fish Springs Range to the south, and the Whistler Mountain-Sulphur Springs Range to the west.
Length (km)	63 km.
Average strike	N13°E
Sense of movement	Normal *Comments:* (Nolan and others, 1971 #4342)
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	The fault is marked by bedrock scarps and lineaments on Quaternary alluvium (Dohrenwend and others, 1991 #2480). No studies of scarp morphology or estimates of scarp heights have been made along this section. dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 183 m (158–219 m).
Age of faulted surficial	Dohrenwend and others (1991 #287) show the southern section as displacing early to middle Pleistocene deposits, and possibly late

deposits	Pleistocene deposits.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Although timing of most recent prehistorical event is not well constrained, mapping by Dohrenwend and others (1992 #2480) suggests that the last movement on the southern part of the fault is Pleistocene in age but may be as young as late Quaternary. The northern part of the fault as shown by dePolo (1998 #2845) was not mapped by Dohrenwend and others (1991 #286; 1992 #2480). The fault is herein considered to be Quaternary owing to the considerable uncertainty in age assignment.
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 displacement rate of 0.335 mm/yr for the entire fault zone based on an empirical relationship between his preferred maximum basal facet height and vertical displacement 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 (poor geomorphic expression, general lack of scarps, lack of mapped 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)	2000 Margaret Hisa Redsteer, U.S. Geological Survey R. Ernest Anderson, U.S. Geological Survey, Emeritus Michael N. Machette, U.S. Geological Survey, Retired
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.

#2480 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Ely 1° by 2° quadrangle, Nevada and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2181, 1 sheet, scale 1:250,000.

#4342 Nolan, T.B., Merrriam, C.W., and Brew, D.A., 1971, Geologic map of the Eureka quadrangle, Eureka and White Pine Counties, Nevada: U.S. Geological Survey Miscellaneous Geologic Investigations I-612.