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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.

Crescent Dunes fault (Class A) No. 1340

Last Review Date: 1999-03-02

citation for this record: **Sawyer, T.L., compiler, 1999, Fault number 1340, Crescent Dunes 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 02:13 PM.**

Synopsis	This distributed zone of down-to-the-west normal faults extends along west margin of the San Antonio Mountains and intrabasin fault and across piedmont slopes in eastern Big Smoky Valley, northwest of Tonopah. The southern end of the fault overlaps the northeastern part of the Lone Mountain fault zone [1338] and north end overlaps slightly with the Ione Valley fault [1334]. The main uplift of the range occurred by movement along these high-angle, north-striking faults from middle Miocene to Quaternary. Reconnaissance and detailed photogeologic mapping of these faults are the sources of data. Trench investigations and studies of scarp morphology have not been completed.
Name comments	Faults in this zone have been mapped by Schell (1981 #2844, Plate A6) and by Dohrenwend and others (1996 #2846), and some faults within the San Antonio Mountains that were also mapped by Bonham and Garside (1979 #2930). Schell (1981 #2844) named it the Crescent Dunes fault; dePolo (1998 #2845) later

	referred to it as the Liberty fault. Faults extend along east margin of Big Smoky Valley from southwest of Tonopah, along the west flank of the San Antonio Mountains, to the valley floor west of Willow Springs in southernmost Toquima Range. **Fault ID:** Fault 10 on Plate 7A in Schell (1996 #2846) and fault T8 of dePolo (1998 #2845).
County(s) and State(s)	ESMERALDA COUNTY, NEVADA NYE COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Location based on 1:24,000- and 1:62,500-scale maps of Slemmons (1968, unpublished Tonopah 1:250,000-scale map) and 1:250,000-scale maps by Schell (1981 #2844) and Dohrenwend and others (1996 #2846). Original mapping by Slemmons was from photogeologic analysis of 1:12,000-scale low-sun-angle aerial photography, transferred using proportional dividers to 1:24,000 and 1:62,500-scale topographic maps. Mapping by Schell (1981 #2843; 1981 #2844) is 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 field verification. Mapping by Dohrenwend and others (1996 #2846) from photogeologic analysis of 1:58,000-nominal-scale color-infrared photography transferred directly to 1:100,000-scale topographic maps enlarged to scale of the photographs.
Geologic setting	This distributed zone of down-to-the-west normal faults extends along the west margin of the San Antonio Mountains and intrabasin fault and across piedmont slopes in eastern Big Smoky Valley, northwest of Tonopah. South end of fault overlaps northeast part of the Lone Mountain fault zone [1338] and north end overlaps slightly with the Ione Valley fault [1334]. The main uplift of the range occurred by movement along these north-striking faults from middle Miocene to Quaternary (Kleinhampl and Ziony, 1985 #2851).

Length (km)	50 km.
Average strike	N8°E
Sense of movement	Normal *Comments:* (Bonham and Garside, 1979 #2930; Schell, 1981 #2844; Kleinhampl and Ziony, 1985 #2851).
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	The fault is expressed along the west margin and northwest end of the San Antonio Mountains by scarps juxtaposing Quaternary alluvium against bedrock and echelon scarps on high-level piedmont slope surfaces. Subparallel scarps continue northward across a piedmont slope to axis of Big Smoky Valley and southward across a piedmont slope to west and southwest of Tonopah. Schell (1981 #2844) reported eroded scarps on late Pleistocene alluvial deposits as much as 4 m high. Range-front parallel faults with suspected Quaternary movement are marked by scarps and prominent lineaments on bedrock and Tertiary volcanic rocks (Slemmons, 1968, unpublished Tonopah 1:250,000-scale map; Bonham and Garside, 1979 #2930; Schell, 1981 #2844; Dohrenwend and others, 1996 #28460. Only one of these faults cuts Quaternary alluvial deposits (Kleinhampl and Ziony, 1985 #2851).
Age of faulted surficial deposits	Latest Quaternary, Quaternary, middle Tertiary. Schell (1981 #2844) mapped scarps on late and possibly early Pleistocene alluvial deposits and faults cutting middle Tertiary volcanic rocks. Dohrenwend and others (1996 #2846) indicate the scarps are on Pleistocene. Slemmons (1968, unpublished Tonopah 1:250,000-scale map) mapped scarps on Pleistocene piedmont-slope deposits, a few short scarps north of Hall Mine, and a fault suspected to have Holocene movement at north end.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Although timing of most recent prehistorical event is not well constrained, Schell (1981 #2844) suggested late Pleistocene which is consistent with mapping by Dohrenwend and

	others (1996 #2846); although unpublished map of Slemmons suggests four short faults with inferred Holocene movement.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* dePolo (1998 #2845) assigned a reconnaissance vertical slip rate of 0.01 mm/yr for the fault based on the presence of scarps on alluvium and the absence of basal facets. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) support a low slip rate. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
Date and Compiler(s)	1999 Thomas L. Sawyer, Piedmont Geosciences, Inc.
References	#2930 Bonham, H., and Garside, L., 1979, Geologic map of the Tonopah, Lone Mountain, Klondike, and northern Mud Lake quadrangles: Nevada Bureau of Mines and Geology Bulletin 92, 142 p. #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. #2846 Dohrenwend, J.C., Schell, B.A., Menges, C.M., Moring, B.C., and McKittrick, M.A., 1996, Reconnaissance photogeologic map of young (Quaternary and late Tertiary) faults in Nevada, *in* Singer, D.A., ed., Analysis of Nevada's metal-bearing mineral resources: Nevada Bureau of Mines and Geology Open-File Report 96-2, 1 pl., scale 1:1,000,000. #2851 Kleinhampl, F.J., and Ziony, J.I., 1985, Geology of Northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99A, 172 p. #2843 Schell, B.A., 1981, Faults and lineaments in the MX Sitting Region, Nevada and Utah, Volume I: Technical report to U.S. Department of [Defense] the Air Force, Norton Air Force Base, California, under Contract FO4704-80-C-0006, November 6, 1981, 77 p.

	#2844 Schell, B.A., 1981, Faults and lineaments in the MX Siting Region, Nevada and Utah, Volume II: Technical report to U.S. Department of [Defense] the Air Force, Norton Air Force Base, California, under Contract FO4704-80-C-0006, November 6, 1981, 29 p., 11 pls., scale 1:250,000.