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Quaternary Fault and Fold Database of the United States

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Antelope Range fault zone (Class A) No. 1204

Last Review Date: 2011-01-12

citation for this record: **Lidke, D.J., and Haller, K.M., compilers, 2011, Fault number 1204, Antelope Range 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 Antelope Range fault zone is a relatively continuous, partly sinuous, north- and northeast-striking zone of faults that defines mostly the eastern edge of Antelope Valley. The southern part of the zone is characterized mainly by a relatively linear, northeast-striking, down-to-the-west, range front fault along the western flank of the Antelope Range. This range front fault juxtaposes bedrock of the Antelope Range against Quaternary piedmont-slope deposits of the eastern margin of Antelope Valley and forms locally northwest-facing scarps along this fault. The central part of the fault zone, which appears to be continuous with the linear range front fault, crosses Fenstermaker Wash where it is characterized mainly by a sinuous zone of north- to northeast-striking, west-facing scarps entirely on Quaternary piedmont deposits. A 135-m-high scarp along the central part of the fault zone suggests that this scarp is the product of tens of individual movements along the fault zone. The northern part of the fault

	zone is marked by northeast striking, down-to-the-west, range front faults and west-facing scarps, which are present along the western flank of the Mahogany Hills. There is evidence for the most recent faulting event that is no older than late Pleistocene along the entire fault zone. Down-to-the-west stratigraphic offset along the range front faults, as well as the west-facing direction of most of the scarps, imply mostly down-to-the-west Quaternary movement along the fault zone.
Name comments	Refers to north- and northeast-striking faults that were mapped by Kleinhampl and Ziony (1985 #2851), Schell (1981 #2844), and Dohrenwend and others (1992 #283). Schell (1981 #2844) mapped and referred to the southern and central parts of the fault zone as the Antelope Valley fault, whereas Kleinhampl and Ziony (1985 #2851) referred to the northern part of this fault as the Mahogany Hills fault. dePolo (1998 #2845) referred to the entire length of the fault zone as the Antelope Range fault zone and that name is used herein. The fault zone extends from about 3 km east of Devon Peak south along the western side of the Mahogany Hills, across Fenstermaker Wash and along the western flank of the Antelope Range to the southern end of Antelope Valley. **Fault ID:** Refers to fault 1 as mapped by Schell (1981 #2844) and to fault MI22 as portrayed by dePolo (1998 #2845).
County(s) and State(s)	NYE COUNTY, NEVADA EUREKA COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Location based on 1:250,000-scale maps of Schell (1981 #2844) and Dohrenwend and others (1992 #283). Mapping by Schell (1981 #2843; 1981 #2844) included field verification but was based primarily on photogeologic analysis of 1:24,000-scale, color aerial photography and was supplemented by analysis of some 1:60,000-scale, black-and-white aerial photography. Faults identified on the aerial photographs were transferred by inspection to 1:62,500-scale topographic maps that were photographically reduced to 1:250,000-scale for final compilation of the faults on 1:250,000-scale topographic maps. Mapping by Dohrenwend and others (1992 #283) was based on photogeologic

	analysis of 1:58,000-nominal-scale, color-infrared photography transferred directly to 1:100,000-scale topographic maps enlarged to the scale of the photographs. These maps were then reduced and compiled at 1:250,000-scale.
Geologic setting	This north-striking fault zone is marked by range front faults along the western flanks of the Antelope Range and Mahogany Hills and by scarps on piedmont- slope and deposits of the adjacent Antelope Valley (Schell, 1981 #2844; Dohrenwend and others, 1992 #283). The Antelope Range is underlain by Paleozoic sedimentary rock and by Tertiary volcanic rock (Kleinhampl and Ziony, 1985 #2851). The Antelope Range fault zone and the nearby Antelope Peak fault [1203] are range front faults that together block out most of the Antelope Valley (Schell, 1981 #2844; Dohrenwend and others, 1992 #283). The down-to-the-west stratigraphic offset shown along the range front faults, as well as the west-facing direction of the scarps, suggest principally down-to-the-west Quaternary movement along the fault zone that may reflect continued down-dropping and adjustment of the Antelope Valley relative to the adjacent mountain ranges and hills. The Mahogany Hills are also underlain by Paleozoic rock but lack a cover of Tertiary volcanic rock (Lehner and others, 1961 #4363); the northern part of the fault zone bounds the Mahogany Hills and is characterized by discontinuous, north- to northeast-striking scarps and faults that trend into bedrock (Schell, 1981 #2844; Dohrenwend and others, 1992 #283). The southern part of the fault is characterized by a relatively continuous, down-to-the-west, range front fault that follows the western flank of the Antelope Range and connects northward with prominent west-facing scarps that cross Fenstermaker Wash (Schell, 1981 #2844; Dohrenwend and others, 1992 #283).
Length (km)	49 km.
Average strike	N22°E
Sense of movement	Normal *Comments:* Not specifically reported; the apparent down-to-the-west, stratigraphic offset along short, range front faults and the predominantly west-facing direction of scarps suggest principally down-to-the-west offset along faults of this zone, which in this extensional regime, probably reflects principally normal dip-slip movement along west-dipping faults.

Dip Direction	W *Comments:* Not reported; probably steep, based on dip measurements of other Quaternary faults in localities nearby and elsewhere in the Basin and Range Province.
Paleoseismology studies	
Geomorphic expression	The northern part of the fault, along the Mahogany Hills, is expressed by several north- and northeast striking, parallel, and en echelon faults and scarps (Schell, 1981 #2844; Dohrenwend and others, 1992 #283). A few of these fault-related features are short, discontinuous, down-to-the-west, range front faults that place Paleozoic bedrock of the Mahogany Hills against Quaternary piedmont-slope deposits of Antelope Valley. The majority of the fault-related features are west-facing scarps. According to Schell (1981 #2844) some of these faults and scarps trend into bedrock of the Mahogany Hills and some scarps identified in the bedrock may be Quaternary. Schell (1981 #2844) reported maximum scarp heights of about 2 m along this section of the fault zone. To the south, the fault is expressed by a relatively continuous, northeast-striking, range front fault along the western flank of the Antelope Range and by northeast-striking scarps that cross Fenstermaker Wash and appear to connect with the range front fault (Schell, 1981 #2844; Dohrenwend and others, 1992 #283). The range front fault shows down-to-the-west, stratigraphic offset, which places Paleozoic bedrock of the Antelope Range against Quaternary piedmont-slope deposits of adjacent Antelope Valley and locally forms scarps along the range front fault (Schell, 1981 #2844; Dohrenwend and others, 1992 #283). The scarps that cross Fenstermaker Wash are west facing, relatively continuous features on Quaternary piedmont and piedmont-slope deposits and they are associated with some linear features that probably are also fault related (Schell, 1981 #2844; Dohrenwend and others, 1992 #283). Along the range front part of this section of the fault zone dePolo (1998 #2845) reported the presence of alluvial and bedrock fault scarps, over-steepened basal slopes, eroded large and small fault facets, and Pleistocene entrenchment of virtually all major alluvial fans. dePolo (1998 #2845) also reported the piedmont part of this section of the fault zone is marked by a continuous, large, compound fault scarp that is interrupted by moderately well, to well-developed (incised) drainages. Schell (1981 #2844) reported a maximum scarp height of about 41 m

	and a maximum scarp angle of about 21 degrees for this compound fault scarp on the piedmont of Fenstermaker Wash.
Age of faulted surficial deposits	Dohrenwend and others (1992 #283) assigned a late Pleistocene age to faulted deposits/surfaces along several scarps of this section and assigned latest Pleistocene to Holocene to faulted deposits/surfaces along one scarp in Fenstermaker Wash. Schell (1981 #2844) reported an age of 15-700 ka for the youngest faulted fan deposits. Schell (1981 #2844) suggested that these deposits probably are no older than 200 ka. Based on relative soil development, dePolo (1998 #2845) assigned a preferred age of 200 ka (130-730 ka) to the faulted surface along the southern part of this section of the fault zone.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* The timing of the most recent faulting event is not well constrained. Reconnaissance photogeologic mapping by Dohrenwend and others (1992 #283) indicated that it is no older than late Pleistocene (<130 ka or <30 ka). Photogeologic mapping and some field verification by Schell (1981 #2844) implied that the most recent faulting event is certainly no older than middle Pleistocene (<750 ka) and is probably no older than late Pleistocene (<130 ka). Photogeologic mapping and some field verification by Schell (1981 #2844) implies that the most recent faulting event is no older than middle Pleistocene (<750 ka) and is probably no older than late Pleistocene (<130 ka). dePolo (1998 #2845) reported that the fault zone is expressed by a mix of moderate- and low-activity features that suggest middle to late Quaternary faulting events.
Recurrence interval	Geomorphic evidence for three coseismic surface ruptures resulting in 3–3.7 m of vertical displacement near Wily Creek are presented by Koehler and Wesnousky (2011 #7175).
Slip-rate category	Less than 0.2 mm/yr *Comments:* dePolo (1998 #2845) calculated a preferred vertical slip rate of 0.03 mm/yr based on eye-height measurement of a 6.8-m-high scarp north of Meadow Creek. From this measurement he determined a preferred vertical offset of 5.7 m and assumed a preferred age of 200 ka for the soil developed on

	this faulted alluvial surface. dePolo (1998 #2845) also reported that the fault zone is expressed by a mix of moderate- and low-activity features that suggest middle to late Quaternary faulting events.
Date and Compiler(s)	2011 David J. Lidke, U.S. Geological Survey Kathleen M. Haller, U.S. Geological Survey
References	#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. #283 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Millett 1° by 2° quadrangle, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2176, 1 sheet, scale 1:250,000. #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. #7175 Koehler, R.D., and Wesnousky, S.G., 2011, Late Pleistocene regional extension rate derived from earthquake geology of late Quaternary faults across the Great Basin, Nevada, between 38.5 degrees N and 40 degrees N latitude: Geological Society of America Bulletin, v. 123, no. 3-4, p. 631–650, doi:10.1130/B30111.1. #7773 Koehler, R.D., III, 2009, Late Pleistocene regional extension rate derived from earthquake geology of late Quaternary faults across Great Basin, Nevada between 38.5° and 40° N. latitude: Reno, University of Nevada, unpublished Ph.D. dissertation, 119 p. #4363 Lehner, R.E., Tagg, K.M., Bell, M.M., and Roberts, R.J., 1961, Preliminary geologic map of Eureka County, Nevada: U.S. Geological Survey Mineral Investigations Field Studies Map MF-178, 1 sheet, scale 1:250,000. #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.

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