[Jump to Navigation]

Quaternary Fault and Fold Database of the United States

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Railroad Valley fault zone, central section (Class A) No. 1380b

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Synopsis	**General:** Railroad Valley fault zone is a long, down-to-the west, normal fault along the east side of Railroad Valley. Reconnaissance photogeologic mapping of tectonic geomorphic features and two site-specific studies of scarp morphology are the sources of data. Trench investigations and detailed studies of scarp morphology along the entire length of the fault zone have not been completed. **Sections:** This fault has 3 sections. Although not studied in detailed, the general movement history defines the sections expressed here. The northern and southern sections are characterized by older movement. The central section has had late Quaternary movement.
Name	**General:** Refers to the East Railroad fault of Schell (1981

comments	#2844), the Mount Hamilton fault (89 in Schell, 1981 #2843), in part to the Currant fault of Nitchman (1991 #2547), and to the Railroad Valley fault zone of dePolo (1998 #2845). The later name is used herein. The fault zone extends along the eastern margins of Railroad Valley and southern Newark Valley, bounding from north to south the White Pine, Grant, and the northern Quinn Canyon Ranges. **Section:** This informally named section refers to the East Railroad fault on Plate A6 of Schell (1981 #2844) and includes the Currant fault of Nitchman (1991 #2547). This section bounds the front of the Grant Range from west of Troy Peak south to northernmost Quinn Range east of Nyala Ranch. **Fault ID:** Referred to as the fault 89 and 100 by Schell (1981 #2843). dePolo (1998 #2845) shows this fault as LD1 on his index map but clearly the fault is EY15 (Mt. Hamilton fault) in his tables.
County(s) and State(s)	WHITE PINE 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 1:250,000-scale maps of Schell (1981 #2844) and of Dohrenwend and others (1991 #287). Original mapping by Schell (1981 #2843; 1981 #2844) 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 field verification. Mapping by Dohrenwend and others (1991 #287) based on 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	Moderately dipping, down-to-the-west, normal fault that bounds Railroad Valley, and the range front of the northern Quinn Canyon, Grant, and White Pine Ranges. There may be as much as

	4.8 km of total vertical separation across the fault zone (Bortz and Murray, 1979 #2853; Anderson and others, 1983 #2852).
Length (km)	This section is 94 km of a total fault length of 140 km.
Average strike	N3°W (for section) versus N10°E (for whole fault)
Sense of movement	Normal *Comments:* (Schell, 1981 #2844; Dohrenwend and others, 1991 #287; Nitchman, 1991 #2547).
Dip	57° W. *Comments:* Fault dips at least 57° based on subsurface data of the Eagle Springs oil field (Horton, 1968 #2854). Anderson and others (1983 #2852) present a listric and a high-angle model for fault dip based on subsurface data, and favor the high-angle planar-fault model.
Paleoseismology studies	
Geomorphic expression	This part of the fault is marked by truncated piedmont slopes, a few fault facets, abrupt, well-defined fault scarps and less well defined scarps within and juxtaposing Quaternary alluvium against bedrock, and by lineaments on Quaternary and Tertiary deposits (Schell, 1981 #2844; Dohrenwend and others, 1991 #287). Fault forms continuous scarp on piedmont slope at large remnant in range front at Currant. Maximum scarp height of 39 m is reported by Schell (1981 #2844); the location of the scarp is not documented. The overall preservation of scarps suggests this part of the fault has ruptured more recently than the ends.
Age of faulted surficial deposits	Latest Pleistocene and/or Holocene (0 to 30 k.y.) through Tertiary (Dohrenwend and others, 1991 #287); post assumed Tahoe-aged (35 to 70 k.y.) outwash deposits (Nitchman, 1991 #2547);post Bruhnes-Matuyana magnetic reversal (15 to 700 k.y.) (Schell, 1981 #2843; 1981 #2844).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Although timing of the most recent event is not well

	constrained, reconnaissance study by Dohrenwend and others (1991 #287) suggests a late Quaternary (0 to 30 k.y.) time based on surface morphology, and soil development. Schell (1981 #2843; 1981 #2844), Kleinhampl and Ziony (1985 #2851), Nitchman (1991 #2547), Ramelli and dePolo (1993 #2855), and dePolo (1998 #2845) generally agree that the most recent event is late Pleistocene based on field reconnaissance. Nitchman (1991 #2547) and Ramelli and dePolo (1993 #2855) used a fault scarp profile to suggest an early Holocene to latest Pleistocene event with a vertical displacement of 1.5-2.5 m along the Railroad Valley fault zone. A portion of the most recent fault scarp has been removed by shoreline erosion Schell (1981 #2844) related to a late Pleistocene pluvial lake that occupied central Railroad Valley (Nitchman, 1991 #2547).
Recurrence interval	*Comments:* Although, trench investigations and detailed studies of scarp have not been completed, Nitchman (1991 #2547) suggested a recurrence interval of 9 to 23 k.y. assuming that bevels on scarp near Currant Creek represent 3 or 4 events post Tahoe-age (35 to 70 k.y.) outwash deposits.
Slip-rate category	Less than 0.2 mm/yr *Comments:* Nitchman (1991 #2547) and Ramelli and dePolo (1993 #2855) estimated a vertical displacement rate of 0.1–0.2 mm/yr based on a 7-m-high fault scarp near Current Creek on assumed Tahoe-aged (35–70 k.y.) deposits. dePolo (1998 #2845) and dePolo and Anderson (2000 #4471) calculated a preferred vertical displacement rate of 0.07 mm/yr (0.02–0.11 mm/yr) for the fault, based on 12.6–14.2 m of measured offset of a deposit assumed to be 130–750 ka. However, in the tabulation of assigned slip rates, dePolo (1998 #2845) assigned a vertical displacement rate of 0.01 mm/yr for the fault based on the presence of scarps on alluvium and the absence of basal facets. Regardless, the late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) support a low rate. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
Date and Compiler(s)	1998 Thomas L. Sawyer, Piedmont Geosciences, Inc.
References	#2852 Anderson, R.E., Zoback, M.L., and Thompson, G.A.,

1983, Implications of selected subsurface data on the structural form and evolution of some basins in the northern Basin and Range province, Nevada and Utah: Geological Society of America Bulletin, v. 94, p. 1055-1072.

#2853 Bortz, L.C., and Murray, D.K., 1979, Eagle Springs oil field, Nye County, Nevada, *in* Newman, G.W., and Goode, H.D., eds., Basin and Range Symposium and Great Basin field conference: Rocky Mountain Association Geologists and Utah Geological Association, p. 441-453.

#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.

#4471 dePolo, C.M., and Anderson, J.G., 2000, Estimating the slip rates of normal faults in the Great Basin, USA: Basin Research, v. 12, p. 227-240.

#287 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Lund 1° by 2° quadrangle, Nevada and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2180, 1 sheet, scale 1:250,000.

#2854 Horton, R.C., 1968, Basin and range faulting at the Eagle Springs oil field, Nye County, Nevada: Geological Society of America Special Paper 101, 313 p.

#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.

#2547 Nitchman, S.P., 1991, Currant fault: Nevada Bureau of Mines and Geology Fault Evaluation Report , 2 p., 1 scarp profile.

#2855 Ramelli, A.R., and dePolo, C.M., 1993, Examples of Holocene and latest Pleistocene faulting in northern and eastern Nevada: Geological Society of America Abstracts with Programs, v. 25, no. 5, p. 136.

#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.