Jump to Navigation

Quaternary Fault and Fold Database of the United States

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Paradise Range fault zone (Class A) No. 1321

Last Review Date: 1998-07-26

citation for this record: **Sawyer, T.L., and Lidke, D.J., compilers, 1998, Fault number 1321, Paradise 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 02:15 PM.**

Synopsis	This zone of echelon down-to-the-west normal faults bounds the west front of the north-northeast-trending Paradise Range, extends across piedmont slopes in Gabbs Valley and has intermontane faults. In three places south of Gabbs minor surface ruptures occurred along this southern section during the 1932 Cedar Mountain earthquake. The principal sources of data consist of geologic mapping, reconnaissance photogeologic mapping, reconnaissance geomorphic study of fault scarps and basal fault facets, and detailed mapping of 1932 surface ruptures.
Name comments	Refers to faults mapped by Gianella and Callaghan (1934 #1515), Kleinhampl and Ziony (1985 #2851), Vitaliano and Callaghan (1963 #2916), Dohrenwend and others (1992 #283; 1996 #2846), and Molinari (1984 #1584). dePolo (1998 #2845) referred to it as the Paradise Range fault system and a slight modification of that name is used here. The fault zone extends from southeast of Gold

	Ledge Mine northward along the eastern side of Gabbs Valley, west of the Paradise Range and through Gabbs. North of Gabbs, the fault bends to the east and it then extends farther northward along the range front bounding the east side of Lodi Valley to about the Lander-Nye County line, where low hills connect the Paradise Range to the Desatoya Mountains farther north. **Fault ID:** Refers to faults T2A and T2B of dePolo (1998 #2845).
County(s) and State(s)	CHURCHILL COUNTY, NEVADA NYE COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Location based chiefly on 1:250,000-scale map of Dohrenwend and others (1996 #2846) which shows mapping done 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. The 1932 rupture traces are from a 1:48,000-scale map of dePolo (1994 #2458) that is a detailed compilation of the 1932 rupture zone based on original mapping by Gianella and Callaghan (1934 #1515) and on later mapping by Molinari (1984 #1584), supplemented by photogeologic analysis of 1:12,000-scale, low-sun angle, aerial photography and field reconnaissance.
Geologic setting	This down-to-the-west normal fault zone bounds the west front of the north-northeast-trending Paradise Range, subparallel piedmont faults in Gabbs Valley, and has two short faults bounding small alluvial basins within the range northeast of Gabbs.
Length (km)	38 km.
Average strike	N19°E
Sense of movement	Normal *Comments:* (Gianella and Callaghan, 1934 #1515; Vitaliano and Callaghan, 1963 #2916; Dohrenwend and others, 1996 #2846).
Dip Direction	W; N

Paleoseismology studies	
Geomorphic expression	This major range front fault defines the abrupt west front of the Paradise Range and juxtaposes Quaternary deposits against bedrock. Locally, the frontal fault is marked by short scarps on high-level piedmont-slope surfaces along the northeastern margin of Lodi Valley and several subparallel scarps on Quaternary piedmont-slope surfaces in the embayment between Brucite and Downeyville (Dohrenwend and others, 1992 #283; 1996 #2846; dePolo, 1998 #2845). In three locations south of Gabbs, small scarps (less than 7 cm) and ground cracks from the 1932 Cedar Mountain earthquake were documented (Gianella and Callaghan, 1934 #1515; dePolo, 1994 #2458; Dohrenwend and others, 1996 #2846; dePolo, 1998 #2845). dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 158 m (134-183 m).
Age of faulted surficial deposits	Dohrenwend and others (1992 #283; 1996 #2846) mapped short scarps on late Quaternary (10-130 ka and <130 ka) piedmont-slope deposits.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Although the timing of the most recent prehistoric faulting event is not well constrained, reconnaissance photogeologic mapping by Dohrenwend and others (1992 #283; 1996 #2846) suggest late Quaternary (<130 ka) for the most recent prehistoric event.
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)	1998 Thomas L. Sawyer, Piedmont Geosciences, Inc. David J. Lidke, U.S. Geological Survey
References	#2458 dePolo, C.M., 1994, Surface faulting associated with the December 20, 1932 Cedar Mountain earthquake, central Nevada: Nevada Bureau of Mines and Geology Open-File Report OF-94-4, scale 1:24,000. #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. #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. #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. #1515 Gianella, V.P., and Callaghan, E., 1934, The Cedar Mountain, Nevada, earthquake of December 20, 1932: Bulletin of the Seismological Society of America, v. 24, p. 345- 377. #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. #1584 Molinari, M.P., 1984, Late Cenozoic geology and tectonics of Stewart and Monte Cristo Valleys, west-central Nevada: Reno, University of Nevada, unpublished M.S. thesis, 124 p., 7 pls., scale 1:62,500.

	#2916 Vitaliano, C.H., and Callaghan, E., 1963, Geology of Paradise Peak quadrangle, Nevada: U.S. Geological Survey Geologic quadrangle Map GQ-250, scale 1:62,500.