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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.

East Carson Valley fault zone (Class A) No. 1286

Last Review Date: 1998-07-19

citation for this record: **Adams, K., and Sawyer, T.L., compilers, 1998, Fault number 1286, East Carson Valley 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 highly distributed group of predominately north-striking faults is part of the Sierra Nevada frontal fault system. It extends from the California border in the vicinity of Double Springs Flat north through low bedrock hills and along the east side of Carson Valley to the Carson River. The fault zone is up to 13 km wide. On September 12, 1994, the Double Springs Flat earthquake (M 6.3) produced minor, discontinuous ground cracks, with little displacement. In the area around Double Springs Flat and north to the southern Carson valley, faults are primarily intermontane and are expressed as prominent lineaments in the form of aligned drainages, saddles, and small topographic escarpments. While many of these faults only involve bedrock, others displace Holocene and upper Pleistocene alluvium and Quaternary/Tertiary erosional surfaces or juxtapose young alluvium and old erosional surfaces against bedrock. On the east side of Carson Valley, a

	concentrated zone of north-striking faults are expressed as east- and west-facing scarps found primarily on middle and lower Pleistocene and older erosional surfaces. Reconnaissance photogeologic mapping and bedrock mapping of the faults are the sources of data. Trench investigations and detailed studies of scarp morphology in the Nevada portion of the fault group have not been completed.
Name comments	Refers to a group of faults in eastern Carson Valley that extend south into the hills surrounding Bodie Flat, Long Valley, and Double Springs Flat. Faults mapped by Moore (1961 #2879), Slemmons (1968, unpublished Reno 1? X 2? sheet), Dohrenwend (1981 #2882; 1982 #2481; 1982 #2870), Stewart and others (1982 #2873), Hayes (1985 #2508), and Page and others (1994 #2881). dePolo (1998 #2845) refers to the broadly distributed, but closely spaced faults on the east side of Carson Valley, as the East Carson Valley fault zone. **Fault ID:** Refers to fault number WL2 of dePolo (1998 #2845).
County(s) and State(s)	CARSON CITY COUNTY, NEVADA ALPINE COUNTY, CALIFORNIA DOUGLAS COUNTY, NEVADA
Physiographic province(s)	CASCADE-SIERRA MOUNTAINS BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Locations primarily based on 1:62,500 map of Dohrenwend (1981 #2882). Fault locations checked against 1:250,000-scale mapped of Dohrenwend (1982 #2481; 1982 #2870), which were produced by analysis of 1:58,000-nominal-scale color-infrared photography transferred directly to 1:100,000-scale topographic quadrangle mapped enlarged to scale of the photographs.
Geologic setting	This highly distributed group of predominately north-striking faults is part of the Sierra Nevada frontal fault system (Page and others, 1994 #2881) and extends from the California border in the vicinity of Double Springs Flat north through low bedrock hills and along the east side of Carson Valley; the fault zone is up to 13 km wide.

Length (km)	48 km.
Average strike	N2°E
Sense of movement	Normal *Comments:* (Moore, 1961 #2879; Dohrenwend, 1982 #2481; Hayes, 1985 #2508).
Dip Direction	E; W
Paleoseismology studies	
Geomorphic expression	In the area around Double Springs Flat and north to the southern Carson Valley, faults are primarily intermontane and are expressed as prominent lineaments in the form of aligned drainages, saddles, and small topographic escarpments (Page and others, 1994 #2881). While many of these faults only involve bedrock, others displace Holocene and upper Pleistocene alluvium and Quaternary/Tertiary erosional surfaces or juxtapose young alluvium and erosional surfaces against bedrock (Dohrenwend, 1981 #2882; 1982 #2870). On the east side of Carson Valley, a concentrated zone of north-striking faults are expressed as east- and west-facing scarps found primarily on middle and lower Pleistocene and older erosional surfaces (Moore, 1961 #2879; Dohrenwend, 1981 #2882; 1982 #2481; 1982 #2870; Stewart and others, 1982 #2873). On September 12, 1994, the Double Springs Flat earthquake (M 6.3) produced minor, discontinuous ground cracks, with little displacement, within a 6.5-km-long and 2.5-km-wide region that is approximately centered on the epicenter (Page and others, 1994 #2881). The ground cracks generally coincide with or closely follow north-northwest striking faults mapped by Dohrenwend (1981 #2882) and interpreted from aerial photographs (Page and others, 1994 #2881).
Age of faulted surficial deposits	Holocene and upper Pleistocene through Tertiary. Some of the faults displace Holocene and upper Pleistocene alluvium and juxtapose these same age sediments against bedrock (Dohrenwend, 1981 #2882; 1982 #2481; 1982 #2870; Stewart and others, 1982 #2873). However, most of the faults either involve only bedrock or middle and lower Pleistocene and late Tertiary erosional surfaces.
Historic	Double Springs Flat earthquake 1994

earthquake	Double Springs Flat earthquake 1994
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Although timing of most recent event is not well constrained, a latest Quaternary time is suggested based on mapping by Dohrenwend (1981 #2882; 1982 #2870) and Dohrenwend and others (1996 #2846). Slemmons (1968, unpublished Reno 1? X 2? sheet) reported a late Pleistocene time for faults at and near Dresserville.
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 0.01 mm/yr for the fault based on the presence of scarps on alluvium and the absence of basal facets. 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. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggests 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)	1998 Kenneth Adams, Piedmont Geosciences, Inc. Thomas L. Sawyer, Piedmont Geosciences, Inc.
References	#105 Bell, J.W., 1984, Quaternary fault map of Nevada—Reno sheet: Nevada Bureau of Mines and Geology Map 79, 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. #2882 Dohrenwend, J.C., 1981, Reconnaissance surficial geologic map of the Mt. Siegal quadrangle, Nevada-California: U.S. Geological Survey Open-File Report 81-1156, scale 1:62,500. #2481 Dohrenwend, J.C., 1982, Map showing late Cenozoic

faults in the Walker Lake 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-D, 1 sheet, scale 1:250,000.

#2870 Dohrenwend, J.C., 1982, Surficial geologic map of the Walker Lake 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-C, 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.

#2508 Hayes, G.F., 1985, Late Quaternary deformation and seismic risk in the southern Sierra Nevada Great Basin boundary zone near the Sweetwater Mountains, California and Nevada: Reno, University of Nevada, unpublished M.S. thesis, 135 p.

#2879 Moore, J.G., 1961, Preliminary geologic map of Lyon, Douglas, Ormsby and part of Washoe Counties, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-80, scale 1:200,000.

#2881 Page, W.D., McLaren, M.K., Tsai, Y., and Sawyer, T.L., 1994, Reconnaissance report on the September 12, 1994 Double Springs Flat earthquake, M 6.3 Douglas County, Nevada: Geosciences Department, Pacific Gas and Electric Company (unpublished report), 14 p.

#2873 Stewart, J.H., Carlson, J.E., and Johannesen, D.C., 1982, Geologic map of the Walker Lake 1° by 2° quadrangle, California and Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-A, scale 1:250,000.

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