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Quaternary Fault and Fold Database of the United States

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Fish Creek Range fault zone (Class A) No. 1205

Last Review Date: 2011-01-17

citation for this record: **Lidke, D.J., and Haller, K.M., compilers, 2011, Fault number 1205, Fish Creek 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 Fish Creek Range fault zone consists of a left-stepping en echelon, northeast-striking faults and scarps. Range front faults of this zone show consistent down-to-the-east stratigraphic offset of bedrock of the Fish Creek Range against Quaternary piedmont-slope deposits of the adjacent Fish Creek Valley. Some of these en echelon, range front faults connect with scarps that extend into and across piedmont-slope deposits of Fish Creek Valley, indicating Quaternary movement. Nearly all of the scarps are east-facing features. There is evidence along much of the fault zone for at least one Quaternary faulting event that is no older than late Pleistocene. Down-to-the-east stratigraphic offset along the range front faults, as well as the east-facing direction of most of the scarps, imply mostly down-to-the-east Quaternary movement along the fault zone.
Name	Refers to northeast-striking faults mapped by Lehner and others

comments	(1961 #4363), Schell (1981 #2844), Kleinhampl and Ziony (1985 #2851), and Dohrenwend and others (1992 #283) along the eastern side of the Fish Creek Range. Schell (1981 #2844) mapped and referred to these faults as the Fish Creek Range fault, whereas dePolo (1998 #2845) referred to them as the Fish Creek Springs fault swarm. A slight modification of the earlier name of Schell (1981 #2844) is used here. The Fish Creek Range fault zone extends discontinuously from about Lamoreux Canyon Wash south along the eastern flank of the Fish Creek Range to about Cockalorum. **Fault ID:** Refers to faults that Schell (1981 #2844) mapped and labeled as fault 65, and to faults that dePolo (1998 #2845) portrayed and labeled MI24.
County(s) and State(s)	EUREKA COUNTY, NEVADA NYE 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 that 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 fault zone is marked by northeast striking, left stepping, en echelon faults that follow the eastern flank of the Fish Creek Range (Schell, 1981 #2844; Dohrenwend and others, 1992 #283). The zone appears to terminate at, or merge with, the Park Range fault [1358] near the southern tip of the Fish Creek Range. Schell

	(1981 #2844) and Dohrenwend and others (1992 #283) showed most of these en echelon faults as down-to-the-east, range front faults that connect with east-facing scarps on piedmont-slope deposits of Fish Creek Valley. Geologic mapping by Lehner and others (1961 #4363) and Kleinhampl and Ziony (1985 #2851) indicated that the range front faults place Paleozoic bedrock of the Fish Creek Range against Quaternary fan deposits of the piedmont slope of Fish Creek Valley. The down-to-the-east stratigraphic offset shown along the range-front faults, as well as the east-facing direction of the scarps, suggest principally down-to-the-east Quaternary movement along the fault zone that may reflect continued down dropping and adjustment of Fish Creek Valley relative to the adjacent Fish Creek Range.
Length (km)	28 km.
Average strike	N24°E
Sense of movement	Normal *Comments:* Not specifically reported; the apparent down-to-the-east stratigraphic offsets along the range front faults and the predominantly easterly facing direction of scarps suggest principally down-to-the-east offsets along faults of this zone, which in this extensional regime, probably reflects principally normal dip-slip movement along easterly dipping faults.
Dip Direction	SE *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 Fish Creek Range fault zone is expressed by en echelon, left-stepping system of northeast-striking, range front faults and scarps along the eastern flank of the Fish Creek Range and western piedmont slope of Fish Creek Valley (Schell, 1981 #2844; Dohrenwend and others, 1992 #283). The range front faults are down-to-the-east and place bedrock against Quaternary piedmont-slope deposits. The resultant scarps are consistently east facing on the piedmont-slope (Schell, 1981 #2844; Dohrenwend and others, 1992 #283). Most of the piedmont scarps appear to be

	continuations of the range front faults (Dohrenwend and others, 1992 #283). dePolo (1998 #2845) reported that fault facets are absent along the range front adjacent to the fault zone and he interpreted the absence of these facets as an indicator of a relatively low Quaternary slip rate.
Age of faulted surficial deposits	Dohrenwend and others (1992 #283) assigned late Pleistocene and less certain latest Pleistocene to Holocene to faulted deposits or surfaces along scarps of this zone. Schell (1981 #2844) reported an age range 15–700 ka for the youngest faulted fan deposits and he suggested that these deposits probably are no older than 200 ka. Koehler and Wesnousky (2011 #7175) report that young inset surfaces (Qfy) are not faulted; intermediate surfaces (Qfi) have degraded scarps between 2–3 m high and old surfaces (Qfo) have scarps more than 10 m high.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* The timing of the most recent prehistoric faulting event is not well constrained. Reconnaissance photogeologic mapping by Dohrenwend and others (1992 #283) indicated that the most recent prehistoric faulting event is no older than late Pleistocene (<130 ka). Photogeologic mapping and some field verification by Schell (1981 #2844) implied that the most recent faulting event is no older than middle Pleistocene (<750 ka) and is probably no older than late Pleistocene (<130 ka).
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. Diffusion modeling of scarps on intermediate surfaces suggests vertical separation of 2.7 and 2.3 m associated with coseismic surface rupture around 29.7 and 28 ka. Although vertical rates of deformation cannot be calculated from these data; they do support low rates of deformation.

	Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
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.