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Quaternary Fault and Fold Database of the United States

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Sheep Creek Range western faults (Class A) No. 1149

Last Review Date: 2000-06-29

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Synopsis	The Sheep Creek Range western faults are a group of discontinuous north-striking west-side-down normal faults at the western base of the Sheep Creek Range. The fault is divided into slightly misaligned northern and southern parts, separated at the southeast projection of an unnamed northeast-striking group of faults [1532] in the vicinity of Izzenhood Ranch. As it enters the McDermitt sheet, the northern part of the fault curves clockwise to a northeast strike and projects into the bedrock of the range. The fault is not a major range-bounding structure, but a discontinuous lesser fault that mainly juxtaposes Quaternary alluvium against bedrock. In the Winnemucca and McDermitt sheets, the western margin of the Sheep Creek Range is marked by a discontinuous set of slightly curved convex-west and convex northwest, fault-controlled escarpments that may reflect tectonically related curved faults and/or structurally intersecting

	north- and northeast-striking faults [1533 and 1532]. Steep gullies are etched into these bedrock escarpments, but each escarpment is a relatively continuous feature lacking incision by transverse streams or faceted transverse spurs or ridges. The traces of Quaternary faults in this group are mapped along the base of limited parts of the escarpments; some are characterized by scarps on Quaternary surficial deposits or erosion surfaces and others by fault juxtaposition of Quaternary alluvium against bedrock. There is no published report on the geomorphic expression of the scarps. The southernmost scarp is estimated to be on late Pleistocene (10-130 ka) deposits or surfaces whereas the others are on late Pleistocene and (or) Holocene (0-30 ka) deposits or surfaces.
Name comments	Name applied here to a group of north-striking faults at the western base of the Sheep Creek Range. dePolo (1998 #2845) referred to these faults as the western Sheep Range fault zone, a name not used here because of the misnomer for the Sheep Creek Range. Thus, we modified his name to be Sheep Creek Range western faults. **Fault ID:** Fault referred to as WI14A and WI14B by dePolo (1998 #2845).
County(s) and State(s)	LANDER COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Fault traces taken from Dohrenwend and Moring (1991 #282) who compiled them at 1:250,000-scale based on photogeologic study 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. Only part of the fault (about 3 km) is shown on a 1:125,000-scale map of young fault scarps by Wallace (1979 #203). Additional traces along the southern part of the fault from House and others (2001 #5675) and Ramelli and others(2001 #5676).
Geologic setting	The Sheep Creek Range is a south-pointing plateau-like prominence composed mainly of relatively flat-lying Tertiary volcanic rock. Within the Winnemucca sheet (south of 41? N.),

	the Sheep Creek Range western faults are a group of discontinuous north-striking west-side-down normal faults at the western base of the Sheep Creek Range. The fault is divided into northern and southern parts separated at the southeast projection of unnamed northeast-striking faults [1532] in the vicinity of Izzenhood Ranch. The northern part consists of two traces, an eastern trace along the precipitous west-facing main escarpment and a short (<3 km) western trace along a subsidiary escarpment. As it approaches the McDermitt sheet (41? N.), the main northern part of the fault curves clockwise to a northeast strike and projects into bedrock of the range. There may be structural coupling between the intersecting north- and northeast-striking faults as well as between the north- and northeast-striking parts of the curved fault such that dip slip on the north-striking parts is transferred to oblique left slip on the northeast-striking parts. Dohrenwend and Moring (1991 #282) did not map these faults as major range-bounding structures, but showed them as discontinuous lesser faults that juxtapose Quaternary alluvium against bedrock. To the north, in the McDermitt sheet, faults [1532 and 1533] (also referred to as faults MD10, MD11, and MD12 by dePolo, 1998 #2845) may be related tectonically to the Sheep Creek Range western faults.
Length (km)	34 km.
Average strike	N16°W
Sense of movement	Normal *Comments:* Normal sense based on mapping of Dohrenwend and Moring (1991 #282) and location and orientation within an extensional tectonic province.
Dip Direction	W *Comments:* Possibly steep, consistent with the generally low dip of Tertiary strata in the footwall block.
Paleoseismology studies	
Geomorphic expression	The western margin of the Sheep Creek Range in the Winnemucca and McDermitt sheets (near 41? N.) is marked by a discontinuous set of slightly curved convex-west and convex northwest, fault-controlled escarpments the southern members of

	which (in the Winnemucca sheet) face west, the middle members face northwest, and the north members (in the McDermitt sheet) face north. This varying morphology may be a reflection of curved faults and/or structurally intersecting north- and northeast-striking faults. Steep gullies are etched into the bedrock escarpments, but each escarpment is a relatively continuous feature lacking incision by transverse streams or faceted transverse spurs or ridges. The traces of Quaternary faults are mapped along the base of restricted parts of the escarpments, and some are characterized by scarps on Quaternary surficial deposits or erosion surfaces and others by fault that juxtaposition Quaternary alluvium against bedrock (Dohrenwend and Moring, 1991 #282). There is no published report detailing the geomorphic expression of the scarps. The preferred maximum basal fault facet is reported as 79 m (67-91 m) by dePolo (1998 #2845) along the northern part of the fault, but the southern part of the fault has no basal fault facets.
Age of faulted surficial deposits	Dohrenwend and Moring (1991 #282) mapped about half of the fault as juxtaposing undifferentiated Quaternary alluvium against bedrock and the other half as having scarps formed on Quaternary surficial deposits or erosion surfaces. The southernmost scarp is estimated to be on late and middle Pleistocene and the others are on late Pleistocene and (or) Holocene deposits or surfaces. Wallace (1979 #203) estimated the southernmost scarp to have formed <500 ka. More recent mapping by Ramelli and others (2001 #5676) and House and others (2001 #5675) show that the southern 5 km of fault scarps are on Holocene alluvial fan deposits. Further to the north, the scarps are on or bound late Pleistocene fan deposits by House and others (2001 #5675).
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Late Quaternary timing is based on the estimate from reconnaissance photogeologic studies by Dohrenwend and Moring (1991 #282) that scarps are formed on late Pleistocene deposits or surfaces. However, there is some indication from geologic mapping of the southern part of the fault (House and others, 2001 #5675; Ramelli and others, 2001 #5676) that the most recent event could be Holocene. Wallace (1979 #203) mapped a short (approximately 3-km-long) young scarp on the southern part of the fault that he estimated to have formed in the

	past 500 k.y.
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 0.177 mm/yr for the southern part of the Sheep Creek Range western fault (his fault WI14B) based on an empirical relationship between his preferred maximum basal facet height and vertical slip rate (the northern part of the fault is assigned a reconnaissance vertical slip rate of 0.01 mm/yr). 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)	2000 R. Ernest Anderson, U.S. Geological Survey, Emeritus
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. #282 Dohrenwend, J.C., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the Winnemucca 1° by 2° quadrangle, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2175, 1 sheet, scale 1:250,000. #5675 House, P.K., Ramelli, A.R., and Wrucke, C.T., 2001, Geologic map of the Battle Mountain quadrangle, Lander County, Nevada: Nevada Bureau of Mines and Geology Map 130, 1 sheet, scale 1:24,000. #5676 Ramelli, A.R., House, P.K., Wrucke, C.T., and John, D.A., 2001, Geologic map of the Stony Point quadrangle, Lander County, Nevada: Nevada Bureau of Mines and Geology Map 131, 1 sheet, scale 1:24,000.

	#203 Wallace, R.E., 1979, Map of young fault scarps related to earthquakes in north-central Nevada: U.S. Geological Survey Open-File Report 79-1554, 2 sheet, scale 1:125,000.