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Carico Lake Valley fault zone (Class A) No. 1155

Last Review Date: 2000-06-19

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Synopsis	The Carico Lake Valley fault zone consists of range-front and mid-valley faults. Most fault traces in the zone do not mark sharp topographic breaks at major range fronts, but instead follow irregular and weakly defined margins of ranges and other uplifted structural blocks. Range-margin faults include a north-northeast-striking, down-to-the-east fault along the western margin of Carico Valley along a portion of the Shoshone Range and a subparallel, down-to-the-west fault along the eastern valley margin adjacent to Red Mountain. Splays extend from the western fault north into the Shoshone Range at Stone Cabin Basin and south into Carico Valley in the vicinity of Wholey Well #2. To the northeast, toward Squaw Butte, the western fault breaks into a zone of distributed down-to-the-east and down-to-the-west faults. Major strands of the Carico Lake Valley fault zone form a crude right-stepping array that crosses Carico Valley in the vicinity of

	Carico Lake. Its possible that the right-stepping array reflects northeastward transfer of principal throw from the western side of Carico Valley to the eastern side. Scarps of the Carico Lake Valley fault zone are bipolar and face southeast and northwest. The youngest are estimated to be less than 12 ka. There are no published reports detailing the geomorphology of the scarps and no detailed studies and recurrence times are not reported.
Name comments	Name modified from Wallace (1979 #203), who referred to a zone of scarps in and bordering Carico Lake Valley in the south-central part of the Winnemucca sheet as the Carico Lake Valley scarps. dePolo (1998 #2845) used the name Carico Lake Valley fault zone, which is the name used herein. The zone extends from near Dry Hill Spring in northern Carico Lake Valley southwest along the eastern flank of the Shoshone Range to the Reese River, which cuts through the south end of the range. **Fault ID:** Referred to as WI23A, WI23B, and WI23C 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:* The northern part of the fault zone is compiled primarily from the 1:125,000-scale map of young fault scarps by Wallace (1979 #203). That map was made by photogeologic and field study, mostly using 1:60,000-scale aerial photos. The southern part of the fault zone is compiled from the 1:250,000-scale map of Dohrenwend and others (1992 #283). That map shows mapping based on photogeologic analysis of 1:58,000-nominal-scale, color-infrared photography, which was transferred directly to 1:100,000-scale topographic maps enlarged to the scale of the photographs.
Geologic setting	Carico Lake Valley apparently occupies a northeast-trending structural basin between the Shoshone Range on the west and Red Mountain on the east. The Carico Lake Valley fault zone consists of a north-northeast-striking, down-to-the-east fault along the western margin of Carico Valley and a subparallel down-to-the-

	west fault along the eastern valley margin adjacent to Red Mountain. Splays extend from the western fault south into Carico Valley in the vicinity of Wholey Well #2. To the northeast, toward Squaw Butte, the western fault breaks into a zone of distributed down-to-the-east and down-to-the-west faults. The major strands of the Carico Lake Valley fault zone form a crude right-stepping array that crosses Carico Valley in the vicinity of Carico Lake. The basin to the south of Carico Lake is probably deeper than in the vicinity of (and to the north of) the modern lake (playa) where fault-repeated mid Tertiary siliceous ash-flow tuff is exposed within the valley (Stewart and Carlson, 1978 #3413; Stewart, 1980 #3056). The possibility exists that the right-stepping array reflects northeastward transfer of principal downthrown from the western to eastern sides of Carico Valley.
Length (km)	42 km.
Average strike	N30°E
Sense of movement	Normal *Comments:* Inferred from location in an extensional tectonic province.
Dip Direction	E; W
Paleoseismology studies	
Geomorphic expression	Carico Lake Valley drains northeast through Rocky Pass into the larger, slightly lower Crescent Valley. Much of the margin of Carico Lake Valley is irregular and exhibits a relatively gradual topographic transition from piedmont to bedrock slope, suggesting a lack of recent fault control. However, part of the valley adjacent to the Shoshone Range exhibits an abrupt transition, as does the southeast-facing bedrock escarpment along the fault strand extending into Stone Cabin Basin (Dohrenwend and Moring, 1991 #282). A steep northwest-facing escarpment is present along the spur extending northeast from Red Mountain, and Dohrenwend and Moring (1991 #282) mapped that mountain front as having steep scarps and (or) prominent topographic lineaments on Tertiary volcanic or sedimentary rock. Scarps of the Carico Lake Valley fault zone are bipolar and face southeast and northwest. Mid-valley scarps are discontinuous and short (<5 km). Some scarps near and northeast of Carico Lake follow low but conspicuous bedrock escarpments, but most mid-valley scarps

	are inconspicuous features formed on young surficial deposits. There are no published reports on the geomorphology of the scarps. dePolo (1998 #2845) reported preferred maximum basal facet heights of 171 m (134–189 m), 116 m (104–128 m), and 128 m (1161–40 m) for three separate strands of the Carico Lake Valley fault zone. He used those geomorphic parameters to estimate slip rates.
Age of faulted surficial deposits	On the basis of reconnaissance photogeologic studies, Dohrenwend and Moring (1991 #282) show scarps of the Carico Lake Valley fault zone on all five of their categories of Quaternary surficial deposits and erosion surfaces, which range from Holocene (0–10 ka) to middle and early Pleistocene (0.13–1.6 Ma) age.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Wallace (1979 #203) estimated the timing of last surface faulting to be <12 ka, whereas Dohrenwend and Moring (1991 #282) show scarps on Holocene (0–10 ka) deposits.
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 preferred reconnaissance vertical displacement rates of 0.312, 0.222, and 0.239 mm/yr for three separate strands of the Carico Lake Valley fault zone based on an empirical relationship between his preferred maximum basal facet height and vertical 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 displacement 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. #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. #3056 Stewart, J.H., 1980, Geology of Nevada—A discussion to accompany the geologic map of Nevada: Nevada Bureau of Mines and Geology Special Publication 4, 136 p. #3413 Stewart, J.H., and Carlson, J.E., 1978, Geologic map of Nevada: U.S. Geological Survey, Special Geologic Map, 1, scale 1:500,000. #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.