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.

Little Valley fault (Class A) No. 1648

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Synopsis	The Little Valley fault consists of a prominent range-front fault bounding the west edge of Little Valley that to the north bounds the east front of Slide Mountain and Mount Rose, from near Hobart Creek Reservoir northward to about Galena Creek, and has short subparallel antithetic faults within and along the eastern margin of the valley; Little Valley is an intermontane alluvial basin (graben) within the Carson Range. The Little Valley fault is included in the Washoe Valley segment of the Carson Range fault system of Ramelli and others (1994 #2573) and, in their segmentation model, is related to the Carson Range fault zone [1285] to the south and to Mount Rose fault zone [1647] to the north. Reconnaissance and detailed photogeologic mapping and regional geologic mapping are the sources of data. Detailed trench investigations and detailed studies of scarp morphology have not been conducted.
Name	Refers to faults mapped in Little Valley, an intermontane basin in

comments	the Carson Range west of Washoe Valley by Matthews (1968 #3610), Bonham (1969 #2999), Tabor and Ellen (1975 #3614), Tabor and others (1978 #2626), Bell (1984 #105), Grose (1986 #3609), Lewis (1988 #2527), Ramelli and others (1994 #2573), Ramelli and dePolo (1997 #2579), and Greene and others (1991 #3487). Recently referred to as the Little Valley fault or fault zone (e.g., Ramelli and others, 1994 #2573; dePolo and others, 1997 #1367; Ramelli and dePolo, 1997 #2579). **Fault ID:** Refers to fault numbers R14C (Mount Rose fault zone) of dePolo (1998 #2845).
County(s) and State(s)	WASHOE COUNTY, NEVADA
Physiographic province(s)	CASCADE-SIERRA MOUNTAINS
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Fault locations are based on approximately 1:83,000-scale map of Ramelli and dePolo (1997 #2579, their figure 3) and 1:250,000-scale map of Greene and others (1991 #3487). Mapping by Ramelli and dePolo (1997 #2579) is a compilation of 1:24,000-scale maps of Tabor and Ellen (1975 #3614), Trexler (1977 #3640), Grose (1986 #3609) and Lewis (1988 #2527) that was modified based on detailed analysis of approximately 1:12,000-scale aerial photographs and field reconnaissance.
Geologic setting	The Little Valley fault has a prominent range-front fault bounding the west edge of Little Valley that to the north bounds the east from of Slide Mountain and Mount Rose, from near Hobart Creek Reservoir northward to about Galena Creek, and has short subparallel antithetic faults within and along the eastern margin of the valley (Matthews, 1968 #3610; Tabor and Ellen, 1975 #3614; Grose, 1986 #3609; Lewis and Grose, 1988 #2527; Greene and others, 1991 #3487; Ramelli and others, 1994 #2573; Ramelli and dePolo, 1997 #2579). Little Valley is an intermontane alluvial basin (graben) within the Carson Range (Lewis and Grose, 1988 #2527). The Little Valley fault is part of the Carson Range fault system of Ramelli and others (1994 #2573) and Ramelli and dePolo (1997 #2579) and, therefore, is apparently related to the Carson Range fault zone [1285] to the south and to Mount Rose fault zone [1647] to the north. Cumulative vertical displacement

	across the Little Valley fault and the Washoe Valley fault, at the foot of the Carson Range to the east, is approximately 1 km based on inferred offset of a Tertiary paleoriver channel (Bonham, 1969 #2999).
Length (km)	17 km.
Average strike	N13°E
Sense of movement	Normal *Comments:* (Matthews, 1968 #3610; Tabor and Ellen, 1975 #3614; Grose, 1986 #3609; Lewis, 1988 #2526; Greene and others, 1991 #3487; Ramelli and others, 1994 #2573; Ramelli and dePolo, 1997 #2579).
Dip Direction	E; W
Paleoseismology studies	Ramelli and others (#7778) report on three consultants' trenches that yielded age constraints on the most recent event; two of of the studies support prior data indicating an event about 1,000 yr ago.
Geomorphic expression	The range-front fault is expressed as low and multiple-event scarps (1- to 6-m high) and as an abrupt steep escarpment (Matthews, 1968 #3610; Tabor and Ellen, 1975 #3614; Grose, 1986 #3609; Lewis and Grose, 1988 #2527; Ramelli and others, 1994 #2573; Ramelli and dePolo, 1997 #2579). The scarp on the east flank of Slide Mountain represent about 6 m of normal displacement and has slope angles of 23? to 29? (Ramelli and dePolo, 1997 #2579). Apparently the antithetic faults are also marked by scarps and may deflect minor drainages (Grose, 1986 #3609; Lewis and Grose, 1988 #2527; Ramelli and dePolo, 1997 #2579). dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 244 m (219-268 m).
Age of faulted surficial deposits	latest Quaternary; Quaternary; Cretaceous. Undifferentiated Quaternary deposits, including colluvial, alluvial and landslide deposits, and as young as latest Quaternary are faulted within this zone and have been juxtaposed against Cretaceous granitic bedrock (Grose, 1986 #3609; Lewis and Grose, 1988 #2527; Greene and others, 1991 #3487; Ramelli and dePolo, 1997 #2579).
Historic	

earthquake	
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 of Ramelli and dePolo (1997 #1367) and Lewis (1988 #2526), which is generally consistent with mapping by Tabor and Ellen (1975 #3614), Tabor and others (1978 #2626; 1983 #3615), Bell (1984 #105), Grose (1986 #3609), Lewis and Grose (1988 #2527), Ramelli and others (1994 #2573), and Greene and others (1991 #3487).
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* Assigned slip rate is possible based on general knowledge of slip rates estimated for other faults in the region; although the documented scarps (1-6 m) on alluvium may suggest a lower rate. dePolo (1998 #2845) assigned a preferred reconnaissance vertical slip rate of 0.488 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.
Date and Compiler(s)	1999 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. #2999 Bonham, H.F., 1969, Geology and mineral deposits of Washoe and Storey Counties, Nevada: Nevada Bureau of Mines and Geology Bulletin 70, 140 p., 1 pl., 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. #3487 Greene, R.C., Stewart, J.H., John, D.A., Hardyman, R.F.,

Silberling, N.J., and Sorensen, M.L., 1991, Geologic map of the Reno 1° by 2° quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2154-A, scale 1:250,000.

#3609 Grose, T.L.T., 1986, Geologic map, Marlette Lake quadrangle: Nevada Bureau of Mines and Geology Map 2Cg, scale 1:24,000.

#2526 Lewis, R.L., 1988, Geology, neotectonics, and geologic hazards of the Mount Rose 7.5 minute quadrangle, northern Tahoe Basin, Nevada: Golden, Colorado School of Mines, unpublished M.S. thesis, 121 p., scale 1:24,000.

#2527 Lewis, R.L., and Grose, T.L.T., 1988, Late Quaternary faulting in the northeastern Tahoe Basin and northern Carson Range, Nevada: Eos, Transactions of the American Geophysical Union, v. 69, no. 44, p. 1459.

#3610 Matthews, R.A., 1968, Geologic map of the north half of the Lake Tahoe Basin, California and Nevada: California Division of Mines and Geology Open-File Report, scale 1:62,500.

#2579 Ramelli, A.R., and dePolo, C.M., 1997, Trench and related studies of the northern Sierra Nevada Range-front fault system: National Earthquake Hazards Reduction Program, Final Technical Report, 21 p., scale 1:62,500.

#2573 Ramelli, A.R., dePolo, C.M., and Bell, J.W., 1994, Synthesis of data and exploratory trenching along the northern Sierra Nevada fault zone: National Earthquake Hazards Reduction Program, Final Technical Report, 65 p., scale 1:100,000.

#7778 Ramelli, A.R., dePolo, C.M., and Bell, J.W., year unknown, Paleoseismic studies of the Little Valley fault: Final technical report to the U.S. Geological Survey under Award No. 02HQGR0103, 26 p.

#3614 Tabor, R.W., and Ellen, S., 1975, Geologic map of the Washoe City quadrangle: Nevada Bureau of Mines and Geology Map 5Ag, scale 1:24,000.

#2626 Tabor, R.W., Ellen, S., and Clark, M.M., 1978, Geologic

	hazards map, Washoe City quadrangle: Nevada Bureau of Mines and Geology Map 5An, scale 1:24,000. #3615 Tabor, R.W., Ellen, S., Clark, M.M., Glancy, P.A., and Katzer, T.L., 1983, Geology, geophysics, geologic hazards and engineering and geologic character of earth materials in the Washoe Lake area: Nevada Bureau of Mines and Geology Open-File Report 83-7, 87 p. #3640 Trexler, D.T., 1977, Geologic map-Carson City folio: Nevada Bureau of Mines and Geology Map 1Ag, scale 1:24,000.

Questions or comments?