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.

Nightingale Mountains fault zone (Class A) No. 1614

Last Review Date: 1999-03-22

citation for this record: **Sawyer, T.L., and Adams, K., compilers, 1999, Fault number 1614, Nightingale Mountains 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 02:35 PM.**

Synopsis	This relatively long, generally continuous zone of range-front normal faults borders the prominent western front of Nightingale Mountains from Coyote Canyon north to near Stonehouse Canyon, where the fault zone splays into two branches. The western branch continues a short distance north along the eastern side of Winnemucca Lake (a dry valley), the other branch extends northeast into the northern part of the Nightingale Mountains south of Stonehouse Canyon as an intermontane fault and into southwestern Kumiva Valley as a piedmont fault. The eastern splay may be related to the adjacent unnamed fault zone [1615], because together they form a prominent left-stepping echelon pattern. The Nightingale Range is an east-tilted fault block that bounds the eastern side of the Winnemucca Lake basin, a north-trending, narrow sedimentary trough. The main range-front fault zone juxtaposes Quaternary alluvium against bedrock and is

	expressed as west-facing scarps on locally derived piedmont-slope deposits. Reconnaissance photogeologic mapping and regional geologic mapping are the sources of data. Trench investigations and detailed studies of scarp morphology have not been conducted.
Name comments	Refers to faults mapped by Slemmons (1974, unpublished Lovelock 1? X 2? sheet) and Johnson (1977 #2569) that bound the western side of the Nightingale Mountains on the east side of Winnemucca Lake basin from north of Stonehouse Canyon south to Coyote Canyon. dePolo (1998 #2845) referred to this zone as the Selenite Range fault zone, apparently implying that these faults are related to faults on the western side of Selenite Range [1617] to the north. **Fault ID:** Refers to most of fault LL12B (Selenite Range fault zone) of dePolo (1998 #2845).
County(s) and State(s)	WASHOE COUNTY, NEVADA PERSHING COUNTY, NEVADA
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Fault locations are primarily based on 1:250,000-scale maps of Bell (1984 #105), 1:250,000-scale map of Johnson (1977 #2569), and Slemmons (1974, unpublished Lovelock 1:250,000-scale map). Dohrenwend and others (1991 #285) only show faults in the northern most part of the fault zone as depicted here.
Geologic setting	This relatively long, generally continuous zone of range-front normal faults borders the prominent western front of Nightingale Mountains from Coyote Canyon north to near Stonehouse Canyon, where the fault zone splays into two branches. The western branch continues a short distance north along the eastern side of Winnemucca Lake (a dry valley), the other branch extends northeast into the northern part of the Nightingale Mountains south of Stonehouse Canyon as an intermontane fault and into southwestern Kumiva Valley as a piedmont fault. The eastern splay may be related to the adjacent unnamed fault zone [1615], because together they form a prominent left-stepping echelon pattern. The Nightingale Mountains are an east tilted fault block

	(Stewart, 1978 #2866) that bounds the east side of Winnemucca Lake basin, a north trending, narrow and deep sedimentary trough.
Length (km)	35 km.
Average strike	N6°E
Sense of movement	Normal *Comments:* Normal faults as shown on maps and inferred from topography (Slemmons, 1968, unpublished Reno 1:250,000-scale map; 1974, unpublished Lovelock 1:250,000-scale map; Johnson, 1977 #2569; Dohrenwend and others, 1991 #285).
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	Range-fronts along the western side of the Nightingale Mountains form bedrock escarpments and are apparently expressed as west-facing scarps on Quaternary piedmont deposits (Johnson, 1977 #2569). However, some facets have been clearly modified by the lake, and perhaps heightened by wave action from latest Pleistocene Lake Lahontan (Adams, 1997 #3003). dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 177 m (165–189 m).
Age of faulted surficial deposits	Little is known about the specific age of the faulted deposits. There is general agreement that Quaternary deposits are faulted at least in some locations along the fault (Dohrenwend and others, 1991 #285; Johnson, 1977 #2569), and reconnaissance photogeologic mapping by Slemmons (1968, unpublished Reno 1:250,000-scale map; 1974, unpublished Lovelock 1:250,000-scale map) suggests that late Quaternary deposits are offset. Deposits as young as latest Pleistocene may be faulted along east side of Winnemucca Lake valley because the faults are mapped within the area inundated by the latest Pleistocene Lake Lahontan (Adams, 1997 #3003).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* The timing of most recent event is not well

	constrained and the two map sources differ greatly. Slemmons (1974, unpublished Lovelock 1:250,000-scale map) shows scarps on probable latest Quaternary deposits. Dohrenwend and others (1991 #285) do not map those scarps, and furthermore do not show a fault along the western front of the Nightingale Mountains. The assigned age category reflects the large uncertainty in age suggested by these two sources.
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 0.323 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. 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)	1999 Thomas L. Sawyer, Piedmont Geosciences, Inc. Kenneth Adams, Piedmont Geosciences, Inc.
References	#3003 Adams, K.D., 1997, Late Quaternary pluvial history, isostatic rebound, and active faulting in the Lake Lahontan basin, Nevada and California: Reno, University of Nevada, unpublished Ph.D. dissertation, 169 p. #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. #285 Dohrenwend, J.C., McKittrick, M.A., and Moring, B.C., 1991, Reconnaissance photogeologic map of young faults in the

	Lovelock 1° by 2° quadrangle, Nevada and California: U.S. Geological Survey Miscellaneous Field Studies Map MF-2178, 1 sheet, scale 1:250,000. #2569 Johnson, M.G., 1977, Geology and mineral deposits of Pershing County, Nevada: Nevada Bureau of Mines and Geology Bulletin 89, 115 p., scale 1:250,000. #2866 Stewart, J.H., 1978, Basin-range structure in western North America—A review, *in* Smith, R.B., and Eaton, G.P., eds., Cenozoic tectonics and regional geophysics of the western cordillera: Geological Society of America Memoir 152, p. 1-31, scale 1:2,500,000.