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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.

Granite Springs Valley fault zone (Class A) No. 1622

Last Review Date: 2006-03-16

citation for this record: **Sawyer, T.L., Adams, K., and Haller, K.M., compilers, 2006, Fault number 1622, Granite Springs Valley 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 02:29 PM.**

Synopsis	This relatively long, nearly continuous zone is comprised of (1) normal faults that bound nearly the entire eastern front of the Sahwave Mountains and southeastern front of the Bluewing Mountains; (2) piedmont faults adjacent to these range fronts and across piedmont slope east of Juniper Pass; (3) left-stepping to subparallel intrabasin faults in Granite Springs Valley; and (4) a short intermontane in the Bluewing Mountains. The range-front faults juxtapose Quaternary alluvium against bedrock and are delineated by locally abrupt range front and east-facing scarps on Holocene piedmont-slope deposits. Piedmont faults are expressed by continuous easterly facing scarps on Holocene and Holocene to late Pleistocene piedmont-slope deposits. The intrabasin faults are marked as short, left-stepping en echelon scarps in Granite Springs Valley that face east and to the north merge with the piedmont faults near Granite Spring. The intermontane fault is

	delineated by a linear drainage valley and low escarpment along the eastern side of a bedrock ridge. Reconnaissance photogeologic mapping and regional geologic mapping are the sources of data.
Name comments	Refers to range-front faults that extend along nearly the entire eastern front of the Sahwave Mountains and southeastern front of the Bluewing Mountains, piedmont scarps east of Juniper Pass, and intrabasin faults in Granite Springs Valley from Sage Hen Creek north to southeast of Granite Springs. dePolo (1998 #2845) referred to these faults as the Granite Springs Valley fault zone, the name accepted herein. **Fault ID:** Refers to fault number LL16 of dePolo (1998 #2845).
County(s) and State(s)	CHURCHILL 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 map of Dohrenwend and others (1991 #285) which was produced by analysis 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. Fault locations checked against photogeologic map of Slemmons (1974, unpublished Lovelock 1:250,000-scale map) and 1:250,000 scale geologic map of Johnson (1977 #2569).
Geologic setting	This relatively long, nearly continuous zone is comprised of (1) normal faults that bound nearly the entire eastern front of the Sahwave Mountains and southeastern front of the Bluewing Mountains; (2) piedmont faults adjacent to these range fronts and across piedmont slope east of Juniper Pass; (3) left-stepping to subparallel intrabasin faults in Granite Springs Valley; and (4) a short intermontane in the Bluewing Mountains (Slemmons, 1974 unpublished Lovelock 1:250,000-scale map) and (Johnson, 1977 #2569; Dohrenwend and others, 1991 #285). The Sahwave Mountains are a west-tilted fault block (Stewart, 1978 #2866) with vertical relief of about a kilometer (Wesnousky and others, 2005 #7559).

Length (km)	50 km.
Average strike	N14°E
Sense of movement	Normal *Comments:* Shown as normal, down to the east faults by Dohrenwend and others (1991 #285).
Dip Direction	E
Paleoseismology studies	Site 1622-1. Shawave trench crosses a 1.5-m-high scarp; allluvial fan deposits are offset by two near-vertical faults (Wesnousky and others, 2005 #7559). The most recent coseismic surface rupture occurred 2007±108 cal yr BP. Site 1622-2. The northern trench site is location adjacent to the Blue Wing Mountains and exposes a graben containing discontinuous lenses of volcanic ash interpreted to be Mazama. A radiocarbon age on a sample from the unfaulted A horizon is 5453±109 cal yr BP. Vertical offset across the single-event scarp is 4 m.
Geomorphic expression	The range-front faults juxtapose Quaternary alluvium against bedrock and are characterized by a locally abrupt range front (Slemmons, 1974 unpublished Lovelock 1:250,000-scale map; Johnson, 1977 #2569; Dohrenwend and others, 1991 #285). Piedmont faults are expressed by continuous easterly facing scarps on Holocene and Holocene to late Pleistocene upper piedmont-slope deposits. The intrabasin faults are expressed as short, left-stepping en echelon scarps in Granite Springs Valley that face east and to the north merge with the piedmont faults near Granite Spring. The intermontane fault is delineated by a linear drainage valley and low escarpment along east side of bedrock ridge (Slemmons, 1974 unpublished Lovelock 1:250,000-scale map; Johnson, 1977 #2569; Dohrenwend and others, 1991 #285). dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 250 m (170–270 m).
Age of faulted surficial deposits	Dohrenwend and others (1991 #285) mapped faults that displace Holocene, Holocene to late Pleistocene, late Pleistocene, and Quaternary aged deposits along the eastern front of the Sahwave Mountains. Johnson (1977 #2569) mapped undifferentiated Quaternary alluvium faulted against Tertiary sedimentary rocks.

Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* results from trenching by Wesnousky and others (2006 #&559) indicate that the most recent coseismic surface rupture occurred between 2007±108 cal yr and 7627150 cal yr BP (age of Mazama ash) with the preferred timing about 5453±109 cal yr BP. Latest Quaternary (Holocene) time is indicated based on reconnaissance photogeologic mapping by Dohrenwend and others (1991 #285), which is consistent with a similar analysis by Slemmons (1974, unpublished Lovelock 1:250,000-scale map) who reported a latest Quaternary time for the most recent event.
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* dePolo (1998 #2845) assigned a reconnaissance vertical displacement rate of 0.506 mm/yr 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 rate reflects a long-term average. Even though, the late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) indicate young movement, there exists no data to substantiate recurrent moment in the latest Quaternary (Wesnousky and others, 2006 #7559). Nevertheless, the 0.2–1.0 mm/yr slip-rate category has been assigned to this fault based on the magnitude of dePolo's reconnaissance vertical displacement rate.
Date and Compiler(s)	2006 Thomas L. Sawyer, Piedmont Geosciences, Inc. Kenneth Adams, Piedmont Geosciences, Inc. 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. #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.