

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](#).

Smith Valley fault zone, unnamed northern section (Class A) No. 1291a

Last Review Date: 1999-03-23

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Synopsis

General: This very long, nearly continuous fault zone has: (1) range-front faults bounding east front of Pine Nut Mountains from south end of range to east of Boyle Tunnel and bounding east front of Buckskin Range, Wellington Hills and Sweetwater Mountains; (2) piedmont and intrabasin faults throughout much of Sweetwater Flat, in western and southern Smith Valley, in northwest arm of Smith Valley, and on east piedmont slope of Buckskin Range; and (3) a few intermontane faults east of Desert Creek Peak and in volcanic plateau flanking east side of Pine Nut Mountains near Lyon Peak. Pine Nut Mountains and Wellington Hills represent a west-tilted structural block and Smith Valley probably is a west-tilted half graben based on presence of a marsh on west side of valley near Beaman Lake. Generally, the fault is expressed as scarps on Holocene, upper Pleistocene, and older Pleistocene alluvium and juxtaposes Holocene and upper

Pleistocene alluvium. Range-front faults juxtapose piedmont-slope deposits against bedrock and are expressed as locally abrupt fronts of Pine Nut Mountains, Wellington Hills, and Sweetwater Mountains. Piedmont faults are marked by a small group of scarps at south end of Smith Valley, adjacent to front of Pine Nut Mountains, Sweetwater Mountains, and Buckskin Range. Some of intrabasin faults in southern Smith Valley and in Sweetwater Flat are characterized by short scarps. Intermontane faults east of Desert Creek Peak are delimited by aligned drainage valleys and ridge-crest saddles, and near Lyon Peak are marked by prominent escarpments, two of which bound a large closed depression that appears to be a graben. Although many of these faults displace only bedrock, some also displace Pleistocene alluvium or juxtapose younger against older Pleistocene alluvium, providing evidence for young movement. Detailed work has not been conducted along entire fault zone; reconnaissance photogeologic and field-based mapping of fault zone are the sources of data. Trench investigations have not been completed, but characterization of the scarp morphology has been accomplished for parts of fault zone in Smith Valley and Sweetwater Flat.

Sections: This fault has 3 sections. Although detailed work has not been conducted along entire fault zone, the sections are defined based on general movement history of fault zone (*e.g.*, Hayes, 1985 #2508; Dohrenwend and others, 1996 #2846). The most recent offset along the central section of the fault is clearly young and probably latest Quaternary; the northern and southern parts of the fault do not seem to exhibit young faulting and are assigned a Quaternary age here. The three sections are described together as a zone because of similar trends, style of movement, and reasonable continuity from north to south.

**Name
comments**

General: Refers to faults mapped by Moore (1961 #2879), Slemmons (1966, unpublished Walker Lake 1:250,000-scale map; 1968, unpublished Reno 1:250,000-scale map), Dohrenwend (1982 #2481; 1982 #2870), Dohrenwend and Brem (1982 #2872), Brem (1984 #2887), Hayes (1985 #2508), Stewart and others (1982 #2873; 1989 #2885), Stewart and Dohrenwend (1984 #2886), Stewart and Reynolds (1987 #2888), and Greene and others (1991 #3487) along east side of Pine Nut Mountains from south end of range to east of Boyle Tunnel, and along east side of Wellington Hills and Sweetwater Mountains. The northern two sections have been referred to as the Smith Valley fault zone (or fault system) by previous investigators. Some of the faults in the southern section are referred to as the Sweetwater Flat fault by

	<p>dePolo (1998 #2845).</p> <p>Section: Section extends from east of Boyle Tunnel in northern Pine Nut Mountains, south along the eastside of the mountains, and on either side of Buckskin Range to near the south end of range.</p> <p>Fault ID: Refers to fault WL14 of dePolo (1998 #2845).</p>
<p>County(s) and State(s)</p>	<p>DOUGLAS COUNTY, NEVADA LYON COUNTY, NEVADA</p>
<p>Physiographic province(s)</p>	<p>BASIN AND RANGE</p>
<p>Reliability of location</p>	<p>Good Compiled at 1:100,000 scale.</p> <p><i>Comments:</i> Locations chiefly based on 1:62,500 map of Stewart and Dohrenwend (1984 #2886). Locations were checked against 1:250,000-scale map of Dohrenwend (1982 #2870) which was produced by photogeologic analysis of 1:58,000-nominal-scale color-infrared photography transferred directly to 1:100,000-scale topographic quadrangle maps enlarged to scale of photographs. Selected fault locations are based on 1:250,000-scale maps of Bell (1984 #105), Slemmons (1968, unpublished Reno 1:250,000-scale map), and Greene and others (1991 #3487). Mapping by Bell (1984 #105) is from photogeologic analysis of 1:40,000-scale low sun-angle aerial photography, supplemented with 1:12,000-scale of selected areas, and several low-altitude aerial reconnaissance flights and field reconnaissance of major structural and stratigraphic relationships. Mapping by Slemmons (1968, unpublished Reno 1:250,000-scale map) is from analysis of 1:60,000-scale AMS photography transferred to mylar overlaid onto a 1:250,000-scale topographic map using proportional dividers.</p>
<p>Geologic setting</p>	<p>This very long, nearly continuous fault zone has: (1) range-front faults bounding east front of Pine Nut Mountains from south end of range to east of Boyle Tunnel and bounding east front of Buckskin Range, Wellington Hills and Sweetwater Mountains; (2) piedmont and intrabasin faults throughout much of Sweetwater Flat, in western and southern Smith Valley, in northwest arm of Smith Valley, and on east piedmont slope of Buckskin Range; and (3) a few intermontane faults east of Desert Creek Peak and in</p>

	volcanic plateau flanking east side of Pine Nut Mountains near Lyon Peak (Moore, 1961 #2879; Dohrenwend, 1982 #2481; 1982 #2870; Dohrenwend and Brem, 1982 #2872; Stewart and others, 1982 #2873; Stewart and Dohrenwend, 1984 #2886; Brem, 1984 #2887; Hayes, 1985 #2508; Stewart and Reynolds, 1987 #2888; Stewart and others, 1989 #2885; Greene and others, 1991 #3487); Pine Nut Mountains and Wellington Hills represent a west-tilted structural block (Stewart, 1978 #2866).
Length (km)	This section is 33 km of a total fault length of 88 km.
Average strike	N8°W (for section) versus N6°W (for whole fault)
Sense of movement	Normal <i>Comments:</i> (Dohrenwend, 1982 #2870)
Dip Direction	E; NE; SW
Paleoseismology studies	
Geomorphic expression	Range-front faults juxtapose piedmont-slope deposits against bedrock and are discontinuously expressed as locally abrupt front of Pine Nut Mountains east of Mount Como and as less prominent east front of Buckskin Range. Piedmont faults are apparently marked by small scarps adjacent to front of Pine Nut Mountains and Buckskin Range. Intermontane faults are marked by prominent escarpments, two of which bound a large closed depression that appears to be a graben (Moore, 1961 #2879; Dohrenwend, 1982 #2481; 1982 #2870; Dohrenwend and Brem, 1982 #2872; Stewart and others, 1982 #2873; Bell, 1984 #105; Stewart and Dohrenwend, 1984 #2886; Brem, 1984 #2887; Hayes, 1985 #2508; Stewart and others, 1989 #2885; Greene and others, 1991 #3487).
Age of faulted surficial deposits	Quaternary; Tertiary. Faults in this section displace Quaternary piedmont-slope deposits and Quaternary-Tertiary gravel (Bell, 1984 #105; Stewart and Dohrenwend, 1984 #2886) and Slemmons (1968, unpublished Reno 1:250,000-scale map) apparently indicated that late Quaternary deposits were faulted east of Buckskin Range.
Historic earthquake	
Most recent	undifferentiated Quaternary (<1.6 Ma)

<p>prehistoric deformation</p>	<p><i>Comments:</i> Although the time of the most recent event is not well constrained, a Quaternary time is suspected based on mapping of Dohrenwend and others (1996 #2846).</p>
<p>Recurrence interval</p>	
<p>Slip-rate category</p>	<p>Less than 0.2 mm/yr</p> <p><i>Comments:</i> No detailed data exists to determine slip rates for this section. However, the apparent lack of evidence to suggest that this part of the fault is as young nor as active as the section to the south implies 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.</p>
<p>Date and Compiler(s)</p>	<p>1999 Kenneth Adams, Piedmont Geosciences, Inc. Thomas L. Sawyer, Piedmont Geosciences, Inc.</p>
<p>References</p>	<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.</p> <p>#2887 Brem, G.F., 1984, Geologic map of the Sweetwater Roadless area, Mono County, California and Lyon and Douglas Counties, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-1535-B, scale 1:62,500.</p> <p>#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.</p> <p>#2481 Dohrenwend, J.C., 1982, Map showing late Cenozoic faults in the Walker Lake 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-D, 1 sheet, scale 1:250,000.</p> <p>#2870 Dohrenwend, J.C., 1982, Surficial geologic map of the Walker Lake 1° by 2° quadrangle, Nevada-California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1382-C, 1 sheet, scale 1:250,000.</p> <p>#2872 Dohrenwend, J.C., and Brem, G.F., 1982, Reconnaissance</p>

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