Jump to Navigation

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.

Silver Lake fault (Class A) No. 42

Last Review Date: 1995-10-01

Compiled in cooperation with the California Geological Survey

citation for this record: **Sawyer, T.L., and Bryant, W.A., compilers, 1995, Fault number 42, Silver Lake fault, 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 03:09 PM.**

Synopsis	Although no detailed studies have been conducted along the Silver Lake fault, it offsets several middle Pleistocene deposits and minor Holocene displacement on some branch faults have been documented (e.g., Bailey and Koeppen, 1977 #3322; Clark and others, 1984 #2876; Bryant, 1984 #5578). Clark and others (1984 #2876) reported a late Quaternary vertical slip rate of 0.5 mm/yr based on 30-50 m of vertical offset of Tahoe-aged moraines.
Name comments	Generalized traces of the Sierra Nevada frontal faults in the region of Silver Lake were shown in Lawson (1908 #4969) and mapped, but not named, by Kistler (1966 #5580). This fault has

	been referred to as the Park Lake fault (Clark and others, 1984 #2876) and the Silver Lake fault (e.g., Bryant, 1984 #5578; Bailey, 1989 #5577). The name Silver Lake fault is used in this compilation.,Generalized traces of the Sierra Nevada frontal faults in the region of Silver Lake were shown in Lawson (1908 #4969) and mapped, but not named, by Kistler (1966 #5580). This fault has been referred to as the Park Lake fault (Clark and others, 1984 #2876) and the Silver Lake fault (e.g., Bryant, 1984 #5578; Bailey, 1989 #5577). The name Silver Lake fault is used in this compilation. **Fault ID:** Refers to number 201 (Hartley Springs fault zone; Silver Lake (Parker Lake) fault) of Jennings (1994 #2878) and fault number MA2 (Sliver Lake fault) of dePolo (1998 #2845).
County(s) and State(s)	MONO COUNTY, CALIFORNIA
Physiographic province(s)	CASCADE-SIERRA MOUNTAINS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Locations based on digital revisions to Jennings (1994 #2878) mapping.
Geologic setting	This high-angle, down-to-east normal fault is comprised of two sub-parallel fault traces along the prominent eastern front of central Sierra Nevada. Sherwin-stage (>0.76 Ma) glacial deposits are offset 450 m (Kistler, 1966 #5580; cited in Bryant, 1984 #5578) suggesting that much of the frontal escarpment is fault related (Bryant, 1984 #5578) and developed largely during Quaternary time (1.6 Ma).
Length (km)	33 km.
Average strike	N13°W
Sense of movement	Normal *Comments:* Kistler (1966 #5580).
Dip Direction	E *Comments:* Kistler (1966 #5580).

Paleoseismology studies	
Geomorphic expression	Forms a 500- to 800-m-high compound escarpment along eastern front of Sierra Nevada. Has well defined scarps on bedrock, highly degraded scarps on Sherwin-stage (>0.76 Ma) glacial deposits (dePolo, 1982 #5579), and high (30-50 m) scarps on younger glacial deposits.
Age of faulted surficial deposits	Possible Holocene deposits (along eastern fault trace) mapped by Bailey and Koeppen (1977 #3322), late and middle Pleistocene (Tahoe-stage, 65-130 ka; Sherwin-stage, >0.76 Ma) glacial deposits (Clark and others, 1984 #2876; Bryant, 1984 #5578) Mesozoic bedrock.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Faults cut post-Tahoe and pre-Tioga glacial deposits (Clark and others, 1984 #2876; Bryant, 1984 #5578).
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* On the basis of 30-50 m offset of a Tahoe moraine (65-130 ka) at Parker Lake, Clark and others (1984 #2876) calculated a preferred vertical slip rate of 0.5 mm/yr. Sherwin age (>0.76 Ma) till is offset about 300 m (Kistler, 1966 #5580) suggesting a similar rate of 0.4 mm/yr (Bryant, 1984 #5578). The lack of offset of latest Pleistocene (i.e., Tioga-stage) and Holocene deposits suggests that these middle to early-late Pleistocene rates may not be representative of the slower Holocene rate (Bryant, 1984 #5578), which is similar to other faults in the region, Hartley Springs fault zone [43].
Date and Compiler(s)	1995 Thomas L. Sawyer, Piedmont Geosciences, Inc. William A. Bryant, California Geological Survey
References	#5577 Bailey, R.A., 1989, Geologic map of the Long Valley caldera, Mono-Inyo craters volcanic chain and vicinity, eastern California: U.S. Geological Survey Miscellaneous Investigations

Series Map I-1933, scale 1:62,500.

#3322 Bailey, R.A., and Koeppen, R.P., 1977, Preliminary geologic map of Long Valley caldera, Mono County, California: U.S. Geological Survey Open-File Report 77-468, 20 p.

#5578 Bryant, W.A., 1984, Hartley Springs fault zone, Mono County, California: California Division of Mines and Geology Fault Evaluation Report FER-157, microfiche copy in California Division of Mines and Geology Open-File Report 90-14, 7 p., scale 1:62,500.

#2876 Clark, M.M., Harms, K.H., Lienkaemper, J.J., Harwood, D.S., Lajoie, K.R., Matti, J.C., Perkins, J.A., Rymer, M.J., Sarna-Wojcicki, A.M., Sharp, R.V., Sims, J.D., Tinsley, J.C., III, and Ziony, J.I., 1984, Preliminary slip rate table and map of late Quaternary faults of California: U.S. Geological Survey Open-File Report 84-106, 12 p., 5 plates, scale 1:1,000,000.

#5579 dePolo, C.M., 1982, Eastern Sierra Nevada fault study (literature compilation): Unpublished study for California Division of Safety of Dams, 12 p., 5 pls., scale 1:100,000.

#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.

#2878 Jennings, C.W., 1994, Fault activity map of California and adjacent areas, with locations of recent volcanic eruptions: California Division of Mines and Geology Geologic Data Map 6, 92 p., 2 pls., scale 1:750,000.

#5580 Kistler, R.W., 1966, Geologic map of the Mono Craters quadrangle, Mono and Tuolumne Counties, California: U.S. Geological Survey Geologic quadrangle Map GQ-462, scale 1:62,500.

#4969 Lawson, A.C., chairman, 1908, The California earthquake of April 18, 1906—Report of the State Earthquake Investigation Commission: Washington, D.C., Carnegie Institution of Washington Publication 87.

#4860 Petersen, M.D., Bryant, W.A., Cramer, C.H., Cao, T.,

	Reichle, M.S., Frankel, A.D., Lienkaemper, J.J., McCrory, P.A., and Schwartz, D.P., 1996, Probabilistic seismic hazard assessment for the State of California: California Department of Conservation, Division of Mines and Geology Open-File Report 96-08 (also U.S. Geological Open-File Report 96-706), 33 p.