Jump to Navigation

Quaternary Fault and Fold Database of the United States

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Southern Sierra Nevada fault zone, Haiwee Reservoir section (Class A) No. 65b

Last Review Date: 1995-10-01

citation for this record: **Sawyer, T.L., compiler, 1995, Fault number 65b, Southern Sierra Nevada fault zone, Haiwee Reservoir section, 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 01:33 PM.**

Synopsis	**General:** This range-front fault zone is poorly understood, and no detailed studies involving trenching have been completed. Neither the Independence fault nor the Haiwee Reservoir section has been trenched and only limited large-scale mapping has been published. **Sections:** This fault has 2 sections. Further subdivision of the Sierra Nevada fault zone may be warranted based on small-scale mapping, in particular the Haiwee Reservoir section.
Name comments	**General:** The Southern Sierra Nevada fault zone is comprised of several normal faults that form the eastern front of the southern Sierra Nevada including (from north to south) the Birch Creek fault of Clark (referred to as the Tinemaha scarp by Bateman, 1965 #5587; and Birch Mountain fault in Jennings, 1994 #2878)

	the Independence fault-Haiwee Reservoir "segment", the Sierra Nevada fault of Ross (1990 #5631), and the Cliff Canyon fault of Samsel (1962 #5632). The structure also has been referred to as the Sierra Nevada Frontal fault zone. Knopf (1918 #5616) was the first to map traces of the Independence fault, although he did not name the fault. **Section:** Haiwee Reservoir section extends from the its junction with the southern Owens Valley fault zone [51b] south along the range front to the intersection with the Garlock fault zone [69] and includes the Sierra Nevada fault of (Ross, 1990 #5631) and the Cliff Canyon fault of Samsel (1962 #5632). This section of the Southern Sierra Nevada fault zone was recognized in 1938 by Jenkins (1938 #5628) and includes the Haiwee Reservoir "segment" of Wills (1988 #1690) and the Sierra Nevada fault (Inyokern area) of Jennings (1994 #2878). The term Haiwee Reservoir "section" is used for descriptive purposes. This part of the Sierra Nevada fault zone exhibits variable character along strike, but was not subdivided because of a lack of readily available information. **Fault ID:** Refers to fault numbers 249 (Sierra Nevada fault zone, Haiwee Reservoir area), and 266 (Sierra Nevada fault, Inyokern area) of Jennings (1994 #2878) and fault SNV of Piety (1995 #915).
County(s) and State(s)	INYO COUNTY, CALIFORNIA KERN COUNTY, CALIFORNIA
Physiographic province(s)	CASCADE-SIERRA MOUNTAINS BASIN AND RANGE
Reliability of location	Good Compiled at 1:62,500 scale. *Comments:* Location based on digital revisions to Jennings (1994 #2878) using original mapping by Hsu and Wagner (1990 #5627) at 1:250,000 scale; mapping by Ross (1990 #5631) at 1:125,000 scale; mapping by Samsel (1962 #5632) at 1:39,000 scale; and mapping by Wills (1988 #1690) at 1:24,000.
Geologic setting	The Sierra Nevada fault zone is a zone of high-angle normal faults that bound the eastern front of the southern Sierra Nevada from Owens Valley to the southern end of the range, north of the Garlock fault [69]. The northernmost fault in this zone is the

	Independence fault, which has a cumulative vertical displacement of approximately 1,800 m (Gillespie, 1982 #5626), which accounts for approximately half of the subsidence of Owens Valley (Bryant, 1989 #5625).
Length (km)	This section is 131 km of a total fault length of 203 km.
Average strike	N6°E (for section) versus N6°W (for whole fault)
Sense of movement	Normal
Dip Direction	E
Paleoseismology studies	
Geomorphic expression	In the vicinity of Haiwee Reservoir, the fault forms a prominent east-facing bedrock escarpment that is 1,150 m high; the height and prominence of the escarpment decrease to the south. The fault is expressed by generally degraded scarps and breaks in slope, although locally there are well defined scarps >20 m high having maximum slope angles of about 20? (Wills, 1988 #1690).
Age of faulted surficial deposits	Late Pleistocene (to Holocene?) alluvial-fan deposits (Duffield and Bacon, 1981 #1502; Wills, 1988 #1690).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Fault related features are present on alluvial fans that were mapped by Duffield and Bacon (1981 #1502) as "young alluvium" of late Pleistocene to Holocene age. Wills (1988 #1690) concluded that the most recent paleoevent probably occurred during the late Pleistocene based on a general lack of bar-and-swale topography on the alluvium and on the discontinuous and degraded nature of fault scarps.
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* slip-rate category (probably 0.2-1 mm/yr) is loosely based on the fact that the escarpment along the Haiwee Reservoir

	section is lower and less prominent than along the Independence fault section of the Sierra Nevada fault zone, which has an average slip rate of 0.35 mm/yr (Gillespie, 1982 #5626) and a 2500-m-high escarpment.
Date and Compiler(s)	1995 Thomas L. Sawyer, Piedmont Geosciences, Inc.
References	#5587 Bateman, P.C., 1965, Geology and tungsten mineralization of the Bishop district, California: U.S. Geological Survey Professional Paper 470, 208 p., scale 1:62,500. #5625 Bryant, W.A., 1989, Independence fault zone and related faults, western Inyo County, California: California Division of Mines and Geology Fault Evaluation Report FER-203, microfiche copy in California Division of Mines and Geology Open-File Report 90-14, 13 p., scale 1:24,000. #1502 Duffield, W.A., and Bacon, C.R., 1981, Geologic map of the Coso volcanic field and adjacent areas, Inyo County, California: U.S. Geological Survey Miscellaneous Investigations Map I-1200, 1 sheet, scale 1:50,000. #5626 Gillespie, A.R., 1982, Quaternary glaciation and tectonism in the southeastern Sierra Nevada, Inyo County, California: Pasadena, California Institute of Technology, unpublished Ph.D. dissertation, 695 p., scale 1:62,500. #5627 Hsu, E.Y., and Wagner, D.L., 1990, Map showing recency of faulting, Trona-Kingman quadrangle, California: California Department of Conservation, Division of Mines and Geology unpublished map, scale 1:250,000. #5628 Jenkins, O.P., 1938, Geologic map of California: California Division of Mines, scale 1:500,000. #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. #5616 Knopf, A., 1918, A geologic reconnaissance of the Inyo Range and eastern slope of the southern Sierra Nevada, California, with a section on the stratigraphy of the Inyo Range by Edwin Kirk: U.S. Geological Survey Professional Paper 110, 130

p.

#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.

#915 Piety, L.A., 1995, Compilation of known and suspected Quaternary faults within 100 km of Yucca Mountain, Nevada and California: U.S. Geological Survey Open-File Report 94-112, 404 p., 2 pls., scale 1:250,000.

#5631 Ross, D.C., 1990, Reconnaissance geologic map of the southern Sierra Nevada, Kern, Tulare, and Inyo Counties, California: U.S. Geological Survey Open-File Report 90-337, 120 p., scale 1:125,000.

#5632 Samsel, H.S., 1962, Geology of the southeast quarter of the Cross Mountain quadrangle, Kern County, California: California Division of Mines and Geology Map Sheet 2, scale 1:39,600.

#1690 Wills, C.J., 1988, Little Lake and Airport Lake fault zones, Inyo and Kern Counties, California: California Division of Mines and Geology Fault Evaluation Report FER-199, 11 p.