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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.

Western Toiyabe Range fault zone, China Spring section (Class A) No. 1336b

Last Review Date: 1998-07-21

citation for this record: **Sawyer, T.L., and Lidke, D.J., compilers, 1998, Fault number 1336b, Western Toiyabe Range fault zone, China Spring 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 02:15 PM.**

Synopsis	**General:** This long fault zone is comprised of piedmont faults and a relatively continuous, down-to-the-west, range-front fault along the western front of the north- to northwest-trending, westward-tilted Toiyabe Range. There are no published detailed studies of the fault zone and it is poorly understood; however, scarps on Pleistocene and late Pleistocene surficial deposits, as well as the range front faults, provide evidence of Quaternary movement. The principal sources of data consist of geologic mapping, reconnaissance photogeologic mapping, and reconnaissance geomorphic study of fault scarps and basal fault facets. **Sections:** This fault has 4 sections. Although detailed work has

	not been conducted along the fault zone, four possible sections are defined here based on significant differences in assigned reconnaissance vertical displacement rates and time of most recent movement along strike. The two northern sections [1336a] and [1336b] consist of branching, en echelon range front faults, some piedmont faults marked by scarps, and assigned low reconnaissance vertical displacement rates. The adjacent section to the south [1336c] is a down-to-the-west, range front fault that has prominent and nearly continuous geomorphic expression and is associated with numerous short faults marked by scarps on the adjacent piedmont slope and assigned high reconnaissance vertical displacement rates. The southern section [1336d] consists of a group of en echelon faults on the piedmont slope and floor of southern Reese River Valley and assigned a low reconnaissance vertical displacement rate.
Name comments	**General:** Refers to faults along the western front of the Toiyabe Range that have been mapped by Kleinhampl and Ziony (1985 #2851), McKee (1976 #4348), Stewart and McKee (1968 #4350; 1969 #4352; 1977 #4351), and Dohrenwend and others (1992 #283, 1996 #2846). dePolo (1998 #2845) referred to the southern two sections of this fault zone as the Western Toiyabe Range fault, but referred to the northern two sections as the Southeastern Carico Lake Valley fault. These faults all follow the western flank of the Toiyabe Range in a relatively continuous manner. The Western Toiyabe Range name is more descriptive and used herein for the entire fault along the western flank of the Toiyabe Range. The fault zone extends from about where the Red Mountains join the Toiyabe Range south along the western flank of the Toiyabe Range to about Bakeoven Creek. **Section:** Refers to faults mapped by Dohrenwend and others (1992 #283) along the western flank of the Toiyabe Range. dePolo (1998 #2845) referred to this section [1336b] and to the northernmost section [1336a] as the Southeastern Carico Lake Valley fault; however, the local name China Spring is used informally herein for this section. The China Spring section extends from north to Iowa Creek along the west flank of the Toiyabe Range to just south of Silver Creek. **Fault ID:** Refers to fault MI13A of dePolo (1998 #2845).
County(s) and State(s)	LANDER COUNTY, NEVADA
Physiographic	

Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Location based on 1:250,000-scale map of Dohrenwend and others (1992 #283). Mapping based on 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 the photographs; this map was then reduced and compiled at 1:250,000-scale.
Geologic setting	This long fault zone has piedmont faults along southern Reese River Valley and a down-to-the-west, range-front fault along the western front of the north-northwest-trending, westward-tilted Toiyabe Range (Stewart and McKee, 1977 #4351; Kleinhampl and Ziony, 1985 #2851). South of Austin and U.S. Highway 50, the Toiyabe Range is a well-defined, strongly uplifted horst block with large frontal faults (Stewart and McKee, 1977 #4351). The Western Toiyabe Range fault zone is the west-bounding structure of the horst; the Toiyabe Range fault zone [1337] is the east-bounding structure. North of Austin, the fault zone continues along the western front of the Toiyabe Range; the range does not retain its horst character because the matching fault on the eastern side of the range is poorly defined to absent as shown by Dohrenwend and others (1992 #283).
Length (km)	This section is 17 km of a total fault length of 131 km.
Average strike	N13°E
Sense of movement	Normal *Comments:* Not specifically reported, but west-facing scarps and down-to-the-west, range-front faults mapped by Dohrenwend and others (1992 #283) suggest mainly normal, dip-slip offset along this section of the fault zone.
Dip Direction	NW; W *Comments:* Not reported, but probably steep.
Paleoseismology studies	

Geomorphic expression	This section is marked by north- to north-northeast-trending, en echelon and branching range-front faults and a piedmont fault that is marked by a west-facing scarp. The transition between the piedmont slope and range front is more gradual along this part of the western flank of the Toiyabe Range, compared to the fault sections to the north [1336a] and south [1336c, 1336d].
Age of faulted surficial deposits	Dohrenwend and others (1992 #283) assigned an early to late Pleistocene age to faulted surficial deposits along this section.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Timing of the most recent prehistoric faulting event is not well constrained; however, faulted Quaternary surficial deposits indicate one or more Quaternary events along this section of the fault zone (Dohrenwend and others, 1992 #283).
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 displacement rate of 0.01 mm/yr for the fault based on the presence of scarps on alluvium and the absence of basal facets. The late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) support a low slip rate. Accordingly, the less than 0.2 mm/yr slip-rate category has been assigned to this fault.
Date and Compiler(s)	1998 Thomas L. Sawyer, Piedmont Geosciences, Inc. David J. Lidke, 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. #283 Dohrenwend, J.C., Schell, B.A., and Moring, B.C., 1992, Reconnaissance photogeologic map of young faults in the Millett

	1° by 2° quadrangle, Nevada: U.S. Geological Survey Miscellaneous Field Studies Map MF-2176, 1 sheet, scale 1:250,000. #2846 Dohrenwend, J.C., Schell, B.A., Menges, C.M., Moring, B.C., and McKittrick, M.A., 1996, Reconnaissance photogeologic map of young (Quaternary and late Tertiary) faults in Nevada, *in* Singer, D.A., ed., Analysis of Nevada's metal-bearing mineral resources: Nevada Bureau of Mines and Geology Open-File Report 96-2, 1 pl., scale 1:1,000,000. #2851 Kleinhampl, F.J., and Ziony, J.I., 1985, Geology of Northern Nye County, Nevada: Nevada Bureau of Mines and Geology Bulletin 99A, 172 p. #4348 McKee, E.H., 1976, Geologic map of the Austin quadrangle, Lander County, Nevada: U.S. Geological Survey Geologic quadrangle Map GQ-1307, 1 sheet, scale 1:62,500. #4350 Stewart, J.H., and McKee, E.H., 1968, Geologic map of the southeastern part of Lander County, Nevada: U.S. Geological Survey Open-File Report 68-260, 2 sheets, scale 1:62,500. #4352 Stewart, J.H., and McKee, E.H., 1969, Geologic map of the Hall Creek and western part of the Walti Hot Springs quadrangles, Lander County, Nevada: U.S. Geological Survey Open-File Report 69-269, 2 sheets, scale 1:62,500. #4351 Stewart, J.H., and McKee, E.H., 1977, Geology and mineral deposits of Lander County, Nevada: Nevada Bureau of Mines and Geology Bulletin 88, 106 p., 3 pls.