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Quaternary Fault and Fold Database of the United States

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Western Toiyabe Range fault zone, main Toiyabe section (Class A) No. 1336c

Last Review Date: 1998-07-21

citation for this record: **Sawyer, T.L., and Lidke, D.J., compilers, 1998, Fault number 1336c, Western Toiyabe Range fault zone, main Toiyabe 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 02:13 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 McKee (1976 #4348) and Stewart and McKee (1968 #4350; 1977 #4351); more specifically refers to faults mapped by Dohrenwend and others (1992 #283). dePolo (1998, #2845) referred to this section as the MI13B part of the Western Toiyabe Range fault. The informal main name Toiyabe is applied to this section for descriptive purposes. This section extends from about Italian Creek south along the western front of the Toiyabe Range to about Tierney Creek. **Fault ID:** Refers to fault MI13A of dePolo (1998 #2845).
County(s) and State(s)	LANDER COUNTY, NEVADA NYE 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) which shows mapping done 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 the photographs. The 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 61 km of a total fault length of 131 km.
Average strike	N29°E
Sense of movement	Normal *Comments:* Although not specifically reported, McKee (1976 #4348) showed normal, dip-slip offset across a buried projection of the fault zone in his cross section D-D' and he showed nearby normal dip-slip faults in bedrock of the Toiyabe Range, which are parallel to the fault zone. West-facing fault scarps and down-to-the-west range front faults, as mapped by McKee (1976 #4348), Stewart and McKee (1977 #4351), and Dohrenwend and others (1992 #283), also suggest mainly normal, dip-slip offsets along faults of this section of the zone.

Dip Direction	NW; N *Comments:* Not specifically reported, but probably steep; McKee (1976 #4348) shows a buried projection of the fault zone that ranges in dip from about 75° W. to vertical in his cross section D-D'.
Paleoseismology studies	
Geomorphic expression	This section is marked principally by a relatively continuous, slightly sinuous, north- to northeast trending, range front fault and by numerous similar-trending and west-facing scarps nearby on the adjacent piedmont slope of Reese River Valley (Dohrenwend and others, 1992 #283). dePolo (1998 #2845) reports a maximum preferred basal fault facet height of 244 m (219–268 m).
Age of faulted surficial deposits	Dohrenwend and others (1992 #283) assigned ages as young as latest Pleistocene to Holocene to some faulted surficial deposits, but they queried all but one of these relatively young age assignments to the scarps. They assigned with more confidence late Pleistocene and early to late Pleistocene ages to most of the faulted surficial deposits along this section of the fault zone.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* The timing of the most recent prehistoric faulting event is not well constrained. Dohrenwend and others (1992 #283) assigned late Pleistocene (10 to 130 ka) to faulted surficial deposits at several localities along this section of the fault zone; at fewer localities they assigned (with less confidence) latest Pleistocene to Holocene (<30 ka) to some faulted surficial deposits.
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* No detailed data exists to determine slip rates for this fault. dePolo (1998 #2845) assigned a reconnaissance vertical displacement rate of 0.488 mm/yr based on an empirical relationship between his preferred maximum basal facet height

	and vertical displacement 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. However, the late Quaternary characteristics of this fault (overall geomorphic expression, continuity of scarps, age of faulted deposits, etc.) suggest the slip rate during this period is of a slightly lesser magnitude. Nevertheless, the 0.2–1.0 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.