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.

Stansbury fault zone (Class A) No. 2395

Last Review Date: 1999-10-01

Compiled in cooperation with the Utah Geological Survey

citation for this record: **Black, B.D., and Hecker, S., compilers, 1999, Fault number 2395, Stansbury fault zone, 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 02:58 PM.**

Synopsis	Moderately to poorly understood Quaternary fault zone along the western side of the Stansbury Mountains.
Name comments	**Fault ID:** Refers to fault number 7-10 of Hecker (1993 #642).
County(s) and State(s)	TOOELE COUNTY, UTAH
Physiographic province(s)	BASIN AND RANGE
Reliability of	Good

location	Compiled at 1:250,000 scale. *Comments:* Mapped or discussed by Everitt and Kaliser (1980 #4524), Barnhard and Dodge (1988 #429), Sack (1993 #4514), Helm (1994 #4517), and Geomatrix Consultants, Inc. (1999 #4513). Fault traces from Sack (1993 #4514) and 1:250,000-scale mapping of Barhard and Dodge (1988 #429).
Geologic setting	Generally north-trending normal fault zone bounding the western side of the Stansbury Mountains. The Stansbury Mountains expose mainly Paleozoic rock, and are the centermost of three prominent north-south mountain ranges (including the Oquirrh Mountains to the east and Cedar Mountains to the west) west of the high central part of the Wasatch Range. Surficial geology in the valleys between the ranges is dominated by lake deposits and alluvium.
Length (km)	50 km.
Average strike	N17°W
Sense of movement	Normal
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	The surface trace of the Stansbury fault is simple in the southern half of the fault (south of Pass Canyon) but complex to the north, suggesting the fault may consist of two independent sections. A down-to-the-south cross-fault at Pass Canyon forms the boundary between the sections (Helm, 1994 #4517). In the south, a single fault strand consisting of a main fault and a subsidiary antithetic fault cuts Quaternary alluvial fans and forms a narrow (about 20-m-wide) graben along most of the fault trace (Helm, 1994 #4517). North of Pass Canyon, the trace is a complex fault zone consisting of multiple synthetic and antithetic fault traces showing evidence of Quaternary movement. Based on scarp morphology and observation of stream knickpoints a short distance from the fault trace, Everitt and Kaliser (1980 #4524) concluded that the most recent movement was during the Holocene. Helm (1994 #4517) reports maximum scarp angle vs. scarp height plots suggest the Stansbury fault is generally older than the highstand of Lake Bonneville. However, Geomatrix Consultants, Inc. (1999 #4513)

	states that the southern section of the fault is inferred to have moved in a single event during the early to middle Holocene. From scarp-profile data collected by Geomatrix Consultants, Inc. (1999 #4513), the Stansbury scarps of the southern section appear younger than the Sheeprock [2405], Topliff Hill [2407] and Mercur [2399] fault scarps. Measured scarp heights are from 3.9 to 49.5 m, though net tectonic displacement may be less.
Age of faulted surficial deposits	Early to middle Holocene and late Pleistocene.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Helm (1994 #4517) reports scarps in the north section are modified by shoreline processes, indicating a pre-Bonneville age (>16.8 ka). However, Sack (1993 #4514) indicates air-photo evidence for displaced intermediate and Bonneville shorelines, and maps faults in Lake Bonneville and younger deposits in the northern section. Helm (1994 #4517) observed no evidence to indicate an age for the southern section, which may be younger. Geomatrix Consultants, Inc. (1999 #4513) reports that the geomorphic position of a displaced stream terrace and relatively subdued character of the fault scarp suggests early to middle Holocene (6-10 ka) displacement along the southern section.
Recurrence interval	
Slip-rate category	Between 0.2 and 1.0 mm/yr *Comments:* Assigned slip rate category is based on Swan and others (2004) vertical displacement rate of 0.39±0.04 mm/yr based on summing displacement across subparallel scarps near Indian Hickman Canyon. Helm (1994 #4517) estimated an average geologic slip rate of 0.26 mm/yr based on diffusion modeling of the scarps, but notes this rate is tentative and possibly high. Geomatrix Consultants, Inc. (1999 #4513) estimated a geologic slip rate of 0.39 mm/yr, summing slip rates on individual traces across the fault zone in post-35 ka alluvial-fan and post-18 ka lacustrine deposits west of Indian Hickman Canyon. Slip rates on individual traces range from 0.11-0.15 mm/yr.

Date and Compiler(s)	1999 Bill D. Black, Utah Geological Survey Suzanne Hecker, U.S. Geological Survey
References	#429 Barnhard, T.P., and Dodge, R.L., 1988, Map of fault scarps formed on unconsolidated sediments, Tooele 1° x 2° quadrangle, northwestern Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1990, 1 sheet, scale 1:250,000. #4524 Everitt, B.L., and B.N., K., 1980, Geology for assessment of seismic risk in the Tooele and Rush Valleys, Tooele County, Utah: Utah Geological and Mineral Survey Special Studies 51, 33 p. #4513 Geomatrix Consultants, Inc., 1999, Fault evaluation study and seismic hazard assessment, Private Fuel Storage Facility, Skull Valley, Utah: Technical report to Stone and Webster Engineering Corporation, San Francisco, California, under Contract 4790, 118 p., scale 1:100,000. #642 Hecker, S., 1993, Quaternary tectonics of Utah with emphasis on earthquake-hazard characterization: Utah Geological Survey Bulletin 127, 157 p., 6 pls., scale 1:500,000. #4517 Helm, J.M., 1994, Structure and tectonic geomorphology of the Stansbury fault zone, Tooele County, Utah, and the effect of crustal structure on Cenozoic faulting patterns: Salt Lake City, University of Utah, unpublished M.S. thesis, 128 p. #4514 Sack, D., 1993, Quaternary geologic map of Skull Valley, Tooele County, Utah: Utah Geological Survey Map 150, 16 p. pamphlet, scale 1:100,000. #8525 Swan, F.H., Hanson, K.L., Youngs, R.R., and Angell, M.M., 2004, Paleoseismic investigations of the Stansbury and mid-valley faults, Skull Valley, Utah, *in*Lund, W.L. (ed.), Proceedings, Basin and Range Province Seismic Hazard Summit II: Utah Geological Survey Miscellaneous Publication MF05-2, 21 p.