[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.

North Promontory fault (Class A) No. 2361

Last Review Date: 2004-11-01

Compiled in cooperation with the Utah Geological Survey

citation for this record: **Black, B.D., DuRoss, C.B., McDonald, G.N., and Hecker, S., compilers, 2004, Fault number 2361, North Promontory 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 02:57 PM.**

Synopsis	Range-front fault bounding eastern Hansel Valley showing evidence for Holocene movement and multiple late Pleistocene events. The slip-rate estimates for the North Promontory fault reflect the consensus values of the Utah Quaternary Fault Parameters Working Group (Lund, 2004 #6733). Preferred values of Lund (2004 #6733) approximate mean values based on available paleoseismic-trenching data, and the minimum and maximum values approximate two-sigma (5th and 95th percentile) confidence limits. Confidence limits incorporate both epistemic (e.g., data limitation) and aleatory (e.g., process variability) uncertainty (Lund, 2004 #6733).

Name comments	McCalpin and others' (1992 #613) Hansel Valley eastern margin fault. **Fault ID:** Refers to fault number 6-2 of Hecker (1993 #642).
County(s) and State(s)	BOX ELDER COUNTY, UTAH
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:50,000 scale. *Comments:* Mapped or discussed by McCalpin (1985 #3378), Robison (1986 #4486), Miller and Schneyer (1990 #4487), and McCalpin and others (1992 #613). Mapping from Robison (1986 #4486).
Geologic setting	Basin and Range normal fault bounding eastern Hansel Valley in northern Utah. Hansel Valley is in an aggregation of low, north-trending ranges and narrow valleys in northern Utah between Curlew Valley on the west and the Malad River Valley on the east. The ranges have few outcrops of bare rock, which is typical of weathering and erosion of the Permian Oquirrh Formation, and the valleys have great accumulations of gravel and sand along Lake Bonneville shorelines.
Length (km)	26 km.
Average strike	N13°E
Sense of movement	Normal
Dip Direction	W
Paleoseismology studies	Site 2361-1. McCalpin (1985 #3378) profiled fault scarps and logged a roadcut along Utah Highway 84 at Rattlesnake Pass about 15 km southeast of Snowville. The roadcut, about 100 m east of the inferred northern end of the main trace of the North Promontory fault, exposed a graben bounded by two high-angle subsidiary faults in Quaternary deposits. Stratigraphic relations and soil development indicate only one faulting event since 100 ka. In contrast, scarp profiling and an estimated displacement per event of 2.0–2.5 m on the main trace of the fault about 1.5 km

	south of the roadcut exposure suggest three or four events in the past 15 k.y.
Geomorphic expression	Scarps in pre-Lake Bonneville fan alluvium are found at two locations, but are generally covered by Holocene alluvium elsewhere. Although the fault scarps appear unbeveled, they likely resulted from more than one faulting event. The southern portion of the fault (expressed as a prominent range front) does not displace upper Pleistocene deposits and likely last moved in the early to middle Pleistocene (1.6 Ma to 130 ka) (Miller, 1990 #4487). An antithetic fault 100 m east of the north end of the fault shows evidence for a single event roughly 10–15 ka (based on soil development) that produced a vertical displacement of 2.6 m. This fault also cuts deposits as old as 100 ka.
Age of faulted surficial deposits	Late Pleistocene lacustrine deposits, pre-Lake Bonneville fan alluvium.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Timing based on an antithetic fault 100 m east of the north end of the fault that shows evidence for a single event roughly 10–15 ka (based on soil development) that produced a vertical displacement of 2.6 m.
Recurrence interval	3.7–5 k.y. (<15 ka), 16–35 k.y. (<65 ka). *Comments:* McCalpin and others (1992 #613) indicate a recurrence interval of 3.7-5 k.y., based on a cumulative post-Bonneville (<15 ka) displacement of 8 m (assuming 3 to 4 earthquakes each having 2–2.5 m of displacement), and note that the recurrence interval seems short relative to faults associated with more youthful range fronts. McCalpin and others (1992 #613) also report possible recurrence intervals of 8.6–10.8 and 25–31.3 k.y., calculated using displacement across a pre-Bonneville alluvial fan, which may correlate with either isotope stage 4 (58–72 ka) or stage 6 (140 ka). The long-term recurrence data (since 65–140 ka) are from a valley-ward splay of the range-front fault that may not have been active in all events. Based on a review of available paleoseismic data for the North Promontory

	fault, Lund (2004 #6733) considers the data insufficient to make a recurrence-interval estimate.
Slip-rate category	Less than 0.2 mm/yr *Comments:* Longer-term slip rate is probably less than 0.2 mm/yr, although post-Bonneville slip rate may be 0.2–1.0 mm/yr (McCalpin,1985 #3378). Lund (2004 #6733) indicates a geologic slip rate of 0.2 mm/yr (preferred), and a consensus minimum-maximum range of 0.1–0.5 mm/yr, based on an estimated 8 m of displacement since ~17 ka; however, the rate is based on an open-ended time interval and may not reflect the actual slip rate.
Date and Compiler(s)	2004 Bill D. Black, Utah Geological Survey Christopher B. DuRoss, Utah Geological Survey Greg N. McDonald, Utah Geological Survey Suzanne Hecker, U.S. Geological Survey
References	#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. #6733 Lund, W.R., 2005, Consensus preferred recurrence interval and vertical slip rate estimates—Review of Utah paleoseismic-trenching data by the Utah Quaternary Fault Parameters Working Group: Utah Geological Survey Bulletin 134, compact disk. #3378 McCalpin, J., 1985, Quaternary fault history and earthquake potential of the Hansel Valley area, north-central Utah: U.S. Geological Survey Final Technical Report, 37 p. #613 McCalpin, J., Robison, R.M., and Garr, J.D., 1992, Neotectonics of the Hansel Valley-Pocatello Valley corridor, northern Utah and southern Idaho, *in* Gori, P.L., and Hays, W.W., eds., Assessment of regional earthquake hazards and risk along the Wasatch front, Utah: U.S. Geological Survey Professional Paper 1500, p. G1-G18. #4487 Miller, D.M., and Schneyer, J.E., 1990, Geologic map of the Sunset Pass quadrangle, Box Elder County, Utah: Utah Geological and Mineral Survey Open-File Report 201, 32 p., 1 pl., scale 1:24,000. #4486 Robison, R.M., 1986, The surficial geology and neotectonics of Hansel Valley, Box Elder County, Utah: Logan,

	Utah State University, unpublished M.S. thesis, 120 p., scale 1:24,000.