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Quaternary Fault and Fold Database of the United States

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Strawberry fault (Class A) No. 2412

Last Review Date: 2004-06-01

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 2412, Strawberry 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 02:55 PM.**

Synopsis	Normal fault zone along the eastern side of Strawberry Valley in the Wasatch hinterlands. Two trenches have been excavated across a 7-m-high fault scarp subsidiary to and west of the main trace of the Strawberry fault. Both trenches exposed faulted alluvial-fan deposits estimated to be 15,000-30,000 yrs old, based on soil-development indices. A minimum of two to three events occurred on the fault since 15–30 ka, the most recent of which is Holocene.
Name comments	**Fault ID:** Refers to fault number 12-4 in Hecker (1993 #642).
County(s) and	

County(s) and State(s)	WASATCH COUNTY, UTAH
Physiographic province(s)	MIDDLE ROCKY MOUNTAINS COLORADO PLATEAUS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Mapped or discussed by Nelson and Martin (1982 #4360) and Nelson and Van Arsdale (1986 #207). Fault traces from mapping of Nelson and Martin (1982 #4360).
Geologic setting	North- to northwest-trending zone of faulting along the eastern and northern side of Strawberry Valley near the western edge of the Uinta Basin. Strawberry Valley is one of several "back valleys of the Wasatch," a line of discontinuous valleys in the Wasatch hinterlands east of the Wasatch Range.
Length (km)	32 km.
Average strike	N13°W
Sense of movement	Normal
Dip	42–72° W. *Comments:* A dip of 63° W. was measured in Co-op Creek trench 1, and 42–72° W. dip in Co-op Creek trench 2 (Nelson and Martin, 1982 #4360), both in alluvial-fan deposits.
Paleoseismology studies	Nelson and Martin (982 #4360) excavated two trenches across a 7-m-high fault scarp subsidiary to and west of the main trace of the Strawberry fault (results also summarized in Nelson and VanArsdale, 1986 #207). In addition, scarp profiles and boreholes provided data for vertical displacement rate estimates. Co-op Creek trench 1 (site 2412-1) was about 2.5 km north of U.S. Highway 40, and Co-op Creek trench 2 (site 2412-2) was about 1.5 km north of the highway. Both trenches exposed faulted alluvial-fan deposits estimated to be 15,000–30,000 yrs old, based on soil-development indices. Trench one revealed evidence for at least three surface-faulting events. Trench two revealed evidence for two events, correlative with the two youngest events in trench one. Radiocarbon age estimates were obtained on buried organic-rich soils exposed in trench two; these soils were originally

	thought to be crack-fill deposits, but were later interpreted as being burrow infillings unrelated to faulting (Nelson and VanArsdale, 1986 #207).
Geomorphic expression	The fault zone is expressed as prominent scarps on alluvium. Scarp height (as much as 7 m) and stratigraphic displacement are much greater than net displacement, due to backtilting and graben formation. Recency of deformation is also indicated by the asymmetry of stream channels (evidence for tectonic tilting) and the presence of knickpoints in small channels above the scarps. The en-echelon pattern of faulting north of the Strawberry Reservoir suggests that the main Strawberry fault is segmented, although similarities in escarpment morphologies suggest a similar movement history along the entire fault.
Age of faulted surficial deposits	Early to middle Holocene.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Evidence for latest Pleistocene and Holocene activity comes from three short alluvial scarps west of the main fault trace, so that associated vertical displacement and rate values are minima for the fault zone as a whole. The compiler believes that doubling these values (for a single-event displacement of 0.2–3.6 m and a vertical displacement rate of 0.07–0.4 mm/year) may provide estimates for the entire fault zone. A minimum of two to three events occurred on the fault since 15–30 ka.
Recurrence interval	5–15 k.y. (<15–30 ka) *Comments:* A minimum of two or three events occurred on the fault since 15–30 ka.
Slip-rate category	Less than 0.2 mm/yr *Comments:* Vertical displacement rates of 0.04–0.17 mm/year (<15–30 ka) and 0.03–0.06 mm/year (<150–300 ka). Long-term rates were determined from dated down-faulted sediment along the main fault. These values are minima, because of an unknown amount of erosion on the upthrown side of the fault. The

	uncertainties in the data prevent resolution of differences in slip histories between the main trace of the fault and subsidiary faults, and Holocene faulting on the main fault can only be inferred.
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. #4360 Nelson, A.R., and Martin, R.A., Jr., 1982, Seismotectonic study for Soldier Creek Dam, Central Utah Project: U.S. Bureau of Reclamation Seismotectonic Report 82-1, 102 p., 6 pls. #207 Nelson, A.R., and VanArsdale, R.B., 1986, Recurrent late Quaternary movement on the Strawberry normal fault, Basin and Range—Colorado Plateau transition zone, Utah: Neotectonics, v. 1, p. 7-37.