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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.

Fish Springs fault (Class A) No. 2417

Last Review Date: 1999-10-01

Compiled in cooperation with the Utah Geological Survey

citation for this record: **Black, B.D., DuRoss, C.B., Hylland, M.D., McDonald, G.N., and Hecker, S., compilers, 1999, Fault number 2417, Fish Springs 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	Holocene fault on the east side of the Fish Springs Range. Trenching studies confirm a youthful age for the most recent event on the fault, and stratigraphic relations in the trenches suggest a clustering of surface-faulting events shortly after the retreat of Lake Bonneville. This fault is the key source for morphometric data on late Holocene scarps in the Basin and Range province.
Name comments	**Fault ID:** Refers to fault number 8-15 of Hecker (1993 #642).

County(s) and State(s)	JUAB COUNTY, UTAH
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Mapped or discussed by Bucknam and Anderson (1979 #332), Hanks and others (1984 #337), Sterr (1985 #351), Bucknam and others (1989 #4600), Machette (1990 #4601), and Oviatt (1991 #4602). Fault traces from 1:250,000-scale mapping of Ertec Western, Inc. (Schell, 1981 #4598) and unpublished 1989 USGS mapping by R.C. Bucknam (1:24,000 scale).
Geologic setting	Range-front normal fault along the eastern base of the Fish Springs Range, a north-trending mountain range in the Basin and Range in western Utah. The mountains have a complex structural history and expose mainly Paleozoic sedimentary rocks. Unconsolidated deposits in the valley east of the range are mainly lake deposits and alluvium.
Length (km)	30 km.
Average strike	N2°W
Sense of movement	Normal
Dip Direction	E
Paleoseismology studies	The U.S. Geological Survey excavated three trenches to determine timing of fault movement to calibrate scarp-morphology data collected by Bucknam and Anderson (1979 #332). One trench, near the northern end of the Fish Springs Range (site 2417-1), exposed monoclinally folded Lake Bonneville sediments (Provo-aged and younger) but no fault ruptures (Michael Machette, USGS, e-mail commun., September 2001). The other two trenches, excavated across a prominent fault scarp (site 2417-2) about 12 km south of the northern trench, both exposed faulted sediment (Michael Machette, e-mail commun., September 2001; Bucknam and others, 1989 #4600). The larger of these two trenches revealed an A horizon buried by scarp-derived colluvium; radiocarbon dating of the A horizon provided a maximum limiting age for the most recent faulting (Bucknam and others, 1989 #4600).

Geomorphic expression	Extreme youth for the fault is suggested by a lack of scarp dissection and by sharply defined knickpoints in small washes within several tens of meters of the scarps, but the scarps lack free faces and thus are likely hundreds to thousands of years old. Scarp profiles by Bucknam and Anderson (1979 #332) indicate 3.3 m of displacement from the most recent event on the fault. Hecker (1993 #642) indicates a straight-line rupture length of 12.1 km, and shows two ages of faulting (a youthful northern half, and an older southern half). Oviatt (1991 #4602) reports that an exposure of Holocene alluvium overlying older, more steeply dipping alluvium on the east side of Fish Springs Flat, across from the Fish Springs fault, shows about 6.5? of pre-Holocene westward backtilting.This fault is the key source for morphometric data on late Holocene scarps in the Basin and Range province (Bucknam and Anderson, 1979 #332).
Age of faulted surficial deposits	Holocene alluvial fan and latest Pleistocene lacustrine deposits of Lake Bonneville (Machette, 1990 #4601; Oviatt, 1991 #4602).
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Scarps appear to be distinctly younger than the Drum Mountains [2432] fault scarps, dated at about 9 ka, and they have a diffusion-based morphologic age of 3 ka (Hanks and others, 1984 #337). Quantitative morphometric indices used by Sterr (1985 #351) yielded a scarp age of 4.8 ka. Faulted post-Provo alluvial fans provide an upper limit for scarp age. A date from soil organics buried by fault-scarp colluvium suggests faulting occurred about 2 ka (Bucknam and others, 1989 #4600).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr
Date and Compiler(s)	1999 Bill D. Black, Utah Geological Survey Christopher B. DuRoss, Utah Geological Survey Michael D. Hylland, Utah Geological Survey Greg N. McDonald, Utah Geological Survey

	Suzanne Hecker, U.S. Geological Survey
References	#332 Bucknam, R.C., and Anderson, R.E., 1979, Estimation of fault-scarp ages from a scarp-height—slope-angle relationship: Geology, v. 7, p. 11-14. #4600 Bucknam, R.C., Crone, A.J., and Machette, M.N., 1989, Characteristics of active faults, *in* Jacobson, J.L., ed., National Earthquake Hazards Reduction Program, summaries of technical reports volume XXVIII: U.S. Geological Survey Open-File Report 89-453, p. 117. #337 Hanks, T.C., Bucknam, R.C., Lajoie, K.R., and Wallace, R.E., 1984, Modification of wave-cut and faulting-controlled landforms: Journal of Geophysical Research, v. 89, no. B7, p. 5771-5790. #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. #4601 Machette, M.N., 1990, Temporal and spatial behavior of late Quaternary faulting, western United States, *in* Jacobson, J.L., ed., National Earthquake Hazards Reduction Program, Summaries of Technical Reports, volume XXXI: U.S. Geological Survey Open-File Report 90-680, p. 438-440. #4602 Oviatt, C.G., 1991, Quaternary geology of the Fish Springs Flat, Juab County, Utah: Utah Geological Survey Special Studies 77, 16 p. #4598 Schell, B.A., 1981, MX siting investigation, faults and lineaments in the MX siting region, Nevada and Utah: Long Beach, California, report no. E-TR-54 for U.S. Air Force, volume I, 77p.; volume II, variously paginated, scale 1:250,000. #351 Sterr, H., 1985, Rates of change and degradation of hillslopes formed in unconsolidated materials—A morphometric approach to date quaternary fault scarps in western Utah; USA: Zeitschrift fuer Geomorphologie N. Folge, v. 29, p. 315-333.