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Quaternary Fault and Fold Database of the United States

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West Pocatello Valley fault (Class A) No. 3506

Last Review Date: 2003-05-01

Compiled in cooperation with the Idaho Geological Survey

citation for this record: **Machette, M.N., and Lewis, R.S., compilers, 2003, Fault number 3506, West Pocatello Valley 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 02:51 PM.**

Synopsis	This is one of a series of about 30 high-angle, down-to-the-east normal faults along the western side of Pocatello Valley that are mainly mapped in or adjacent to bedrock of the Promontory Range. Reportedly, the longest fault displaces older Quaternary piedmont gravels derived from the Promontory Range by as much as 55 m, although the published geologic mapping shows the fault everywhere concealed (dotted) by Quaternary deposits.
Name comments	Name applied here to the longest fault along the western side of Pocatello Valley, which straddles the Idaho/Utah border (well south of the city of Pocatello, Idaho). This north-northwest-trending fault extends from about 3 km north of the Idaho/Utah

	border, north-northwest along the western side of Pocatello Valley and the eastern side of the Promontory Range (Allmendinger, 1983 #5153). Its northern end is within Paleozoic bedrock. This fault has been referred to as the "western margin fault" by McCalpin and others (1992).
County(s) and State(s)	ONEIDA COUNTY, IDAHO
Physiographic province(s)	BASIN AND RANGE
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Fault mapped primarily in or along the margin of bedrock at 1:24,000 scale by Allmendinger (1983 #5153). Faulting in this area was studied but not mapped by McCalpin and others (1992 #613); most of their emphasis was on the "eastern margin fault" of the Pocatello Valley (described herein as the North Canyon fault [3507]).
Geologic setting	High-angle, down-to-the-east zone of north-northwest-trending normal faults on the western margin of Pocatello Valley. The longest fault (8 km), which is described herein, reportedly displaces older Quaternary pediment gravel by least 55 m, down-to-the-east (p. G9 in McCalpin and others, 1992 #613). The valley lies near the northeastern margin of the Basin and Range province. Gravity data collected by Harr and Mabey (1976 #6546) indicates that the valley fill is much thinner in Pocatello Valley than in the nearby Curlew (to the west) and Malad (to the east) valleys. This observation led Harr and Mabey (1976 #6546) to conclude that the "Pocatello Valley is a relatively young basin developing in what has formerly been a major mountain mass.
Length (km)	8 km.
Average strike	N22°W
Sense of movement	Normal
Dip Direction	E
Paleoseismology studies	
Geomorphic	Forms subdued range front of the Promontory Mountains (North

expression	Hansel Mountains in Utah), which have about 300 m of topographic relief. Quantitative geomorphologic techniques (mountain-front sinuosity ratios and valley-floor width to height ratios) indicate that the ranges bounding Pocatello Valley are slightly to moderately active (Garr, 1988 #6545; McCalpin, 1992 #613). McCalpin and others (p. G9, 1992 #613) report that older Quaternary gravels are offset at least 55 m along the longest strand of the fault, which is the fault included within for this compilation.
Age of faulted surficial deposits	Older Quaternary pediment gravel (500? ka, McCalpin and others, 1992 #613). However, detailed mapping by Allmendinger (1983 #5153) shows the fault everywhere buried by Quaternary terrace deposits (mainly shoreline deposits of Lake Bonneville). McCalpin and others (1992 #613) concluded that there is no displacement of any Lake Utaho deposits.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* McCalpin and others (1992, p. G9, #613) report that older Quaternary gravel (500? ka) are offset at least 55 m along the longest strand of the fault, which demonstrates Quaternary movement. Owing to this large amount of offset, younger movement seems likely, but is not documented. The subdued and highly embayed topographic signature of the range front indicates that faulting on the west side of the Pocatello Valley is less active than the east side (i.e., P6, East Pocatello Valley fault), but is still moderate to slightly active (McCalpin and others, 1992 #613). Allmendinger (1983 #5153) shows no displacement in deposits of Lake Bonneville. There has been some controversy as to whether or not there was surface rupture from the March 27, 1975, Pocatello Valley earthquake (ML 6.0). As previously mentioned, no surface ruptures have been identified from the work of Garr (1988 #6545) and McCalpin and others (1992 #613), nor were ruptures found during a post-earthquake survey by Rogers and others (1975 #3389). McCalpin and others (1992 #613) tentatively assigned this earthquake to the western margin fault [3506] of Pocatello Valley based on the epicentral location and focal mechanisms derived by Arabasz and McKee (1979 #5875). However, McCalpin and others (1992 #613) concluded that there is no displacement of any Lake Utaho deposits, indicating that no ML 6.2 to 6.3 events have occurred in the past 15 ka. Conversely,

	Bucknam (1976 #5876) reported that there probably was localized valley-floor subsidence of about 13 cm on the basis of geodetic data (releveling of benchmarks).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* Slip rate is poorly documented, but probably slow based on rates for other similar structures in the area. McCalpin and others (1992 #613) calculated a long term rate of 0.11 mm/yr on the basis of 55 m of offset of an early(?) Quaternary (500? ka) pediment. The fault was classified as a lesser Quaternary fault by Breckenridge and others (2003 #5878).
Date and Compiler(s)	2003 Michael N. Machette, U.S. Geological Survey, Retired Reed S. Lewis, Idaho Geological Survey
References	#5153 Allmendinger, R.W., 1983, Geologic map of the North Hansel Mountains, Idaho and Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-1643, 1 sheet, scale 1;24,000. #5875 Arabasz, W.J., and McKee, M.E., compilers, 1979, Utah earthquake catalog, 1850—June 1962, *in* Arabasz, W.J., Smith, R.B., and Richins, W.D., eds., Earthquake studies in Utah, University of Utah Seismograph Stations: University of Utah, Department of Geology and Geophysics, p. 552. #5878 Breckenridge, R.M., Lewis, R.S., Adema, G.W., and Weisz, D.W., 2003, Miocene and younger faults in Idaho: Idaho Geological Survey Map 8, 1 sheet, scale 1:1,000,000. #5876 Bucknam, R.C., 1976, Leveling data from the epicentral area of the March 27, 1975, earthquake in Pocatello Valley, Idaho: U.S. Geological Survey Open-File Report 76-52, 6 p. #6545 Garr, J.D., 1988, Quaternary geology and tectonic geomorphology of the Pocatello Valley area, Idaho-Utah: Logan, Utah State University, unpublished M.S. thesis, 115 p. #6546 Harr, C.J., and Mabey, D.R., 1976, Gravity survey of the Pocatello Valley, Idaho: U.S. Geological Survey Open-File Report 76-766, 12 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. #3389 Rogers, A.M., Langer, C.J., and Bucknam, R.C., 1975, The Pocatello Valley, Idaho, earthquake: Earthquakes and Volcanoes, v. 7, p. 16-18.