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Quaternary Fault and Fold Database of the United States

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Grand Valley fault, Prater Mountain section (Class A) No. 726c

Last Review Date: 2011-02-03

citation for this record: **McCalpin, J.P., Machette, M.N., and Haller, K.M., compilers, 2011, Fault number 726c, Grand Valley fault, Prater Mountain section, 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 02:03 PM.**

Synopsis	**General:** This long fault extends from eastern Idaho into western Wyoming along the western base of the Snake and Salt River Ranges. **Sections:** This fault has 4 sections. Detailed mapping and limited trenching suggest that the fault is composed of four segments and has an additional poorly characterized part. These different parts of the fault suggest that it has different rates of Quaternary displacement and apparently different paleoseismic histories. Those segments are herein considered as informally named sections in accordance with this compilation. From north to south they are: the Swan Valley section [726a], the Grand Valley section [726b], the Prater Mountain section [726c], and the Star Valley

	section [726d]. The southernmost section is the youngest and most active part of the fault. The northern part of the fault is outside the Intermountain Seismic Belt and surface ruptures are less frequent than on those parts to the south.
Name comments	**General:** Name of fault and its sections are modified from Piety and others (1992 #538). Earlier workers in the area restricted the use of "Grand Valley fault" to that part of the structure in Idaho; the southern extension in Wyoming was known as the "Star Valley fault." The use of a single name as utilized by Piety and others (1992 #538) is followed here. The Grand Valley fault extends from about 26 km southeast of Pocatello, Idaho, south to about 22 km south of Afton, Wyoming. **Section:** Piety and others (1992 #538) do not name this part of the fault or include it in discussions of other segments (sections). They suggested that this part of the fault may have not ruptured with adjacent segments and thus has a unique faulting history. This informally named section as shown herein extends from Greys River (location of northern boundary explained in section 726b) south to Prater Canyon, and is located near Prater Mountain. **Fault ID:** Refers to number 22 (Grand Valley fault, Idaho) of Witkind (1975 #320) and numbers 20 and 21 (Star Valley fault, Wyoming) of Witkind (1975 #819).
County(s) and State(s)	LINCOLN COUNTY, WYOMING
Physiographic province(s)	MIDDLE ROCKY MOUNTAINS
Reliability of location	Poor Compiled at 1:100,000 scale. *Comments:* Location of fault is based on a 1:200,000-scale map without topography of Piety and others (1992 #538, fig. 5); the fault?s location is further constrained by satellite imagery and topography at scale of 1:100,000. Reference satellite imagery is ESRI_Imagery_World_2D with a minimum viewing distance of 1 km.
Geologic setting	Down-to-the-west range-front normal fault that extends from near the Snake River Plain southward along the western base of the Snake and Salt River Ranges. Basin fill is estimated to be 2- to 3-

	km thick based on seismic reflection data (Royse and others, 1975 #4391; Dixon, 1982 #4382).
Length (km)	This section is 17 km of a total fault length of 136 km.
Average strike	N7°W (for section) versus N22°W (for whole fault)
Sense of movement	Normal *Comments:* (Piety and others, 1992 #538)
Dip Direction	W
Paleoseismology studies	
Geomorphic expression	
Age of faulted surficial deposits	Piety and others (1992 #538) stated that loess-covered 70-ka alluvial surfaces at the range front are not displaced. However, between Prater Canyon and Dry Creek, loess-covered 70- to 130-ka alluvial fans are displaced.
Historic earthquake	
Most recent prehistoric deformation	late Quaternary (<130 ka) *Comments:* Age assignment is based on data presented by Piety and others (1992 #538)that suggest that at least part of this section has ruptured since 130 ka.
Recurrence interval	40?30 k.y. *Comments:* Mason (1992 #463) suggested a repeat time between earthquakes of 40?30 k.y. for this section based on data presented by Anders and others (1989 #408) who indicated that the most recent event occurred between 10 k.y. and 70 k.y. This recurrence interval is poorly constrained and may not be a representative. In addition, based on the time of most recent movement indicated by Piety and others (1992 #538), the above stated recurrence interval is too short and does not realistically represent the interval since the last event.
Slip-rate category	Less than 0.2 mm/yr *Comments:* The fault is assigned to this low slip-rate category

	based on the absence of scarps on 70-ka deposits (Piety and others, (1992 #538).
Date and Compiler(s)	2011 James P. McCalpin, GEO-HAZ Consulting, Inc. Michael N. Machette, U.S. Geological Survey, Retired Kathleen M. Haller, U.S. Geological Survey
References	#408 Anders, M.H., Geissman, J.W., Piety, L.A., and Sullivan, J.T., 1989, Parabolic distribution of circumeastern Snake River Plain seismicity and latest Quaternary faulting—Migratory pattern and association with the Yellowstone hotspot: Journal of Geophysical Research, v. 94, no. B2, p. 1589-1621. #4382 Dixon, J.S., 1982, Regional structural synthesis, Wyoming salient of Western Overthrust belt: American Association of Petroleum Geologists Bulletin, v. 66, p. 1560-1580. #463 Mason, D.B., 1992, Earthquake magnitude potential of active faults in the Intermountain seismic belt from surface parameter scaling: Salt Lake City, University of Utah, unpublished M.S. thesis, 110 p. #538 Piety, L.A., Sullivan, J.T., and Anders, M.H., 1992, Segmentation and paleoseismicity of the Grand Valley fault, southeastern Idaho and western Wyoming, *in* Link, P.K., Kuntz, M.A., and Platt, L.B., eds., Regional geology of eastern Idaho and western Wyoming: Geological Society of America Memoir 179, p. 155-182. #4391 Royse, F.J., Warner, M.A., and Reese, D.L., 1975, Thrust belt structural geometry and related stratigraphic problems Wyoming-Idaho-northern Utah, *in* Bolyard, D.W., ed., Deep drilling frontiers of the central Rocky Mountains: Denver, Colorado, Rocky Mountain Association of Geologists—1975 Symposium, p. 41-54. #160 Smith, R.B., and Sbar, M.L., 1974, Contemporary tectonics and seismicity of the Western United States with emphasis on the Intermountain seismic belt: Geological Society of America Bulletin, v. 85, p. 1205-1218. #320 Witkind, I.J., 1975, Preliminary map showing known and suspected active faults in Idaho: U.S. Geological Survey Open-File Report 75-278, 71 p. pamphlet, 1 sheet, scale 1:500,000.

	#819 Witkind, I.J., 1975, Preliminary map showing known and suspected active faults in Wyoming: U.S. Geological Survey Open-File Report 75-279, 35 p. pamphlet, 1 sheet, scale 1:500,000.