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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.

Kittitas Valley faults (Class B) No. 560

Last Review Date: 2016-05-20

citation for this record: **Lidke, D.J., and Haller, K.M., compilers, 2016, Fault number 560, Kittitas Valley faults, 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 03:03 PM.**

Synopsis	The existence of these three faults in the Kittitas Valley is based mostly on the pr three north-facing, east-trending scarps on Pliocene gravels that contain tephra la about 3.7 Ma (Waitt, 1979 #5671; Geomatrix Consultants Inc., 1990 #5550). You sediments inferred to be about 130–140 ka do not appear to be offset by the faults #5671). These relations imply that the age of the latest faulting event is bracketed about 3.7 Ma and 130 ka. This range permits one or more Quaternary faulting ev However, because there is no definitive evidence for Quaternary events along the are classified as Class B structures herein.
Name comments	Refers to three east-striking en-echelon faults in the central part of the Kittitas Va given informal X, Y, and Z labels on an early geologic map by Waitt (1979 #5671 are also shown on 1:100,000-scale geologic maps by Tabor and others (1982 #74 Schuster (1994 #5566) and on 1:250,000-scale geologic maps by Walsh and othe #3579) and Schuster and others (1997 #3760). Geomatrix Consultants Inc. (1990 referred to these three faults as the Kittitas Valley faults and that name is also use
County(s) and	

County(s) and State(s)	KITTITAS COUNTY, WASHINGTON
Physiographic province(s)	COLUMBIA PLATEAU CASCADE-SIERRA MOUNTAINS
Reliability of location	Good Compiled at 1:250,000 scale. *Comments:* Location of fault from GER_Seismogenic_WGS84 (http://www.dnr.wa.gov/publications/ger_portal_seismogenic_features.zip, downl 05/23/2016) attributed to Washington Division of Geology and Earth Resources S #7409) 1:100,000-scale geology of Washington.
Geologic setting	The three Kittitas valley faults are east-striking faults that collectively show a rigl pattern in the broad, northwest-trending Kittitas Valley (Waitt, 1976 #5558). The Valley coincides with a broad northwest-trending syncline that is expressed mostl rocks of the Columbia Plateau Basalt Group (Waitt, 1976 #5558). The Kittitas Va northwestern part of the Yakima fold belt subprovince of the Columbia Plateaus p the western boundary of this province with the Cascade-Sierra Mountains provinc The Yakima fold belt is characterized by a series of mostly easterly striking anticl and broad synclinal valleys that are mostly expressed in Miocene-Pliocene volcar sediments (Reidel and others, 1994 #3539). The folds of the Yakima fold belt are associated with easterly striking thrust and reverse faults that locally deform Quat sediments (Campbell and Bentley, 1981 #3513; Reidel, 1984 #5545; Reidel and c #3539; West and others, 1996 #3514). Waitt (1976 #5558) suggests that the right- east-striking Kittitas Valley faults may be thrust or reverse faults that formed in re Cenozoic north-south compression combined with a northwest-trending, right-lat couple. The northwest-striking, Olympic-Wallowa lineament is located southwest Kittitas Valley; this lineament is commonly interpreted to mark a zone that experi distributed, late Cenozoic right-lateral shear (Waitt, 1976 #5558).
Length (km)	27 km.
Average strike	N82°W
Sense of movement	Reverse, Normal *Comments:* The east-striking Kittitas Valley faults are mapped as down-to-the-no related to north-facing scarps (Waitt, 1979 #5671; Tabor and others, 1982 #7408; others, 1987 #3579; Schuster, 1994 #5566; Schuster and others, 1997 #3760). Th faults and their sense of movement are not reported; however, Waitt (1979 #5671 that the faults are probably south-dipping reverse faults related to other east-striki reverse faults of the Yakima fold belt. One short fault at the southern end is mapp a normal sense of movement (Washington Division of Geology and Earth Resour 2005 #7409).

Dip Direction	S *Comments:* Not reported. They are interpreted by Waitt (1979 #5671) to be south reverse faults related to north-south compression and to other easterly striking fau of the Yakima fold belt; as such, they may dip moderately to steeply southward.
Paleoseismology studies	
Geomorphic expression	The eastern and central Kittitas Valley faults are expressed mostly by alignments northern ends of dissected, flat topped ridges that are underlain by Pliocene grave gravel), and these alignments are thought to express north-facing, east-striking sc 1979 #5671). According to Waitt (1979 #5671) and Geomatrix Consultants Inc. ((1) the western scarp is 10–15 m high, about 4.5 km long, and shows stratigraphi that suggest a down-to-the-north throw of at least 30 m, (2) the central scarp is ab and 10 km long, and (3) the eastern scarp is about 11 km long and is not as well e the western and central scarps. Rigby and Othberg (1979 #3738) examined these reported that there was some evidence suggesting the existence of a fault coincid western escarpment, but they noted that evidence for the existence of faults coinc central and eastern escarpments was tenuous.
Age of faulted surficial deposits	Waitt (1979 #5671) reported that the youngest faulted deposits are Pliocene grave contain tephra layers dated at about 3.7 Ma. Waitt (1979 #5671) also noted that si sediments, estimated to be 130–140 ka and 10-20 ka, do not appear to be deform
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* Based on the information presented by Waitt (1979 #5671), the latest along the Kittitas Valley faults probably is bracketed between about 3.7 Ma and 1 range permits one or more Quaternary faulting events.
Recurrence interval	*Comments:* No definitive evidence for Quaternary activity along the Kittitas Valle been reported. If these faults have been active in the Quaternary, the lack of scarp Quaternary deposits estimated to be about 130–140 ka (Waitt, 1979 #5671) may i the recurrence interval is also greater than about 130–140 k.y.
Slip-rate category	Less than 0.2 mm/yr *Comments:* No definitive evidence for Quaternary activity along the Kittitas Valle been reported, however, the lack of scarps in deposits estimated to be about 130–

	1979 #5671) suggests relatively low rates for possible Quaternary slip.
Date and Compiler(s)	2016 David J. Lidke, U.S. Geological Survey Kathleen M. Haller, U.S. Geological Survey
References	#3513 Campbell, N.P., and Bentley, R.D., 1981, Late Quaternary deformation of Ridge uplift in south-central Washington: Geology, v. 9, p. 519–524. #5550 Geomatrix Consultants, Inc., 1990, Seismotectonic evaluation of the Walla section of the Columbia Plateau geomorphic province for Grand Coulee, North, I Pinto, and O'Sullivan Dams; Soda Lake, north Scooteney, and south Scooteney di Technical report to U.S. Department of the Interior, Bureau of Reclamation, Denv under Contract 6-CS-81-07310, April 1990, 129 p. #5545 Reidel, S.P., 1984, The Saddle Mountains—The evolution of an anticline i fold belt: American Journal of Science, v. 284, p. 942-978. #3539 Reidel, S.P., Campbell, N.P., Fecht, K.R., and Lindsey, K.A., 1994, Late C structure and stratigraphy of south-central Washington, *in* Lasmanis, R., and Cher eds., Regional geology of Washington State: Washington Division of Geology an Resources, p. 159-180. #3738 Rigby, J.G., and Othberg, K., 1979, Reconnaissance surficial geologic map Late Cenozoic sediments of the Columbia Basin, Washington: State of Washingto of Natural Resources Division of Geology and Earth Resources Open-File Report 10 pls. #3760 Schuster, E.J., Gulick, C.W., Reidel, S.P., Fecht, K.R., and Zurenko, S., 19 map of Washington-southeast quadrant: Washington Division of Geology and Ear Geologic Map GM-45, 20 p. pamphlet, 2 sheets, scale 1:250,000. #5566 Schuster, J.E., 1994, Geologic map of the east half of the Yakima 1:100,00 Washington: Washington Division of Geology and Earth Resources Open File Re 19 p. pamphlet, 1 sheet, scale 1:100,000. #7408 Tabor, R.W., Waitt, R.B., Jr., Frizzell, V.A., Jr., Swanson, D.A., Byerly, G. R.D., 1982, Geologic map of the Wenatchee 1:100,000 quadrangle, central Washi Geological Survey Miscellaneous Investigations Series Map I-1311, 1 sheet, scale with 26 p. text. #5671 Waitt, R.B., 1979, Late Cenozoic deposits, land forms, stratigraphy, and te Kittitas Valley, Washington: U.S. Geological Survey Professional Paper 1127, 18 #5558 Waitt, R.B., Jr., 1976, Early Pleistocene faulting in Kittitas Valley, *in* Geol

research 1976: U.S. Geological Survey Professional Paper 1000, p. 81.

#3579 Walsh, T.J., Korosec, M.A., Phillips, W.M., Logan, R.L., and Schasse, H.W
Geologic map of Washington-southwest quadrant: Washington Division of Geolo
Resources Geologic Map GM-34, 28 p. pamphlet, 2 sheets, scale 1:250,000.

#7409 Washington Division of Geology and Earth Resources Staff, 2005, Digital
scale geology of Washington State, version 1.0: Washington Division of Geology
Resources Open File Report 2005-3,
http://www.dnr.wa.gov/ResearchScience/Topics/GeologyPublicationsLibrary/Pag
3.aspx.

#3514 West, M.W., Ashland, F.X., Busacca, A.J., Berger, G.W., and Shaffer, M.E
Quaternary deformation, Saddle Mountains anticline, south-central Washington: G
24, no. 12, p. 1123-1126.