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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.

Faults near Unity Valley (Class A) No. 807

Last Review Date: 2002-12-03

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Synopsis	Group of west to northwest trending normal faults form dissected range fronts in vicinity of Unity Valley. Only one of these structures, the King Mountain fault, ex fresh expression of Quaternary faulting. Most studies conclude that late Quaterna displacements have occurred on the King Mountain fault, and the other structures this zone have undergone Quaternary displacement.
Name comments	This group of west to northwest trending normal faults was originally mapped by Brown and Thayer (1966 #3577); the faults were informally named, from north to south, the King Mountain, Bullrun Mountain Foothills, Bullrun Mountain Frontal Ironside Mountain (Border fault of Thayer and Brown, 1973 #3782) faults in subsequent seismotectonic studies (Simpson and others, 1993 #3596; Knudsen an others, 1994 #3594; Wood, 1999 #4042). **Fault ID:** One of these structures, the King Mountain fault, is fault number 66 of Geomatrix Consultants, Inc. (1995 #3593).
County(s) and	BAKER COUNTY, OREGON

State(s)	MALHEUR COUNTY, OREGON
Physiographic province(s)	COLUMBIA PLATEAU
Reliability of location	Good Compiled at 1:24,000 and 1:250,000 scale. *Comments:* Location of fault from ORActiveFaults (http://www.oregongeology.org/arcgis/rest/services/Public/ORActiveFaults/MapS downloaded 06/02/2016) attributed to 1:24,000-scale mapping of Robyn (1977 #7 and Reef (1983 #7802), and 1:250,000-scale mapping of Brown and Thayer (196 #3577).
Geologic setting	Faults near Unity Valley are formed in Oligocene to Miocene and Pliocene volcar and sedimentary rocks that unconformably overlie Triassic and Jurassic sediment rocks (Brown and Thayer, 1966 #3577; Walker and MacLeod, 1991 #3646) that comprise an allocthonous island arc terrane. The northwest-trending faults in the are included in the Vale zone, a northwest-trending set of faults that have been attributed to deep seated dextral shear (Lawrence, 1976 #3506; Robyn and Hoove 1982 #3781; Pezzopane and Weldon, 1993 #149; Mann and Meyer, 1993 #3535). more recent interpretation is that these faults are simply northwest-trending norm faults that do not represent regional shearing (Knudsen and others, 1994 #3594; 1 #3529).
Length (km)	46 km.
Average strike	N61°W
Sense of movement	Normal, Right lateral *Comments:* These northwest-trending faults are included in the Vale zone, a north trending set of faults that have been attributed to deep seated dextral shear (Lawre 1976 #3506; Robyn and Hoover, 1982 #3781; Pezzopane and Weldon, 1993 #149 Mann and Meyer, 1993 #3535). A more recent interpretation is that these faults ar simply northwest-trending normal faults that do not represent regional shearing (Knudsen and others, 1994 #3594; 1996 #3529).
Dip Direction	SW; NE *Comments:* Simpson and others (1993 #3596), Knudsen and others (1994 #3594) Geomatrix Consultants, Inc. (1995 #3593) used estimated dips of 70° and Wong a others (1999 #5654) used estimated dips of 60° for seismic hazard analysis of the Mountain fault.

Paleoseismology studies	
Geomorphic expression	Faults near Unity Valley form linear range fronts in Jurassic to Miocene bedrock; features are marked by faceted spurs, springs, and tonal and vegetation lineament (Simpson and others, 1993 #3596; Knudsen and others, 1994 #3594). However, t range fronts are dissected, and the adjacent basins are filled with Tertiary sedimer rocks rather than Quaternary valley-fill (Brown and Thayer, 1966 #3577); these relations may be attributable to low rates of Quaternary slip (Simpson and others, #3596). The King Mountain fault, which bounds the northeastern margin of Unity Valley, is the only structure in the area that exhibits geomorphic evidence (promi scarps, grabens, and lineaments) of late Quaternary faulting activity (Simpson an others, 1993 #3596; Knudsen and others, 1994 #3594; Geomatrix Consultants Inc 1995 #3593).
Age of faulted surficial deposits	No fault scarps are identified on late Quaternary deposits along any of the faults n Unity Valley (Simpson and others, 1993 #3596; Knudsen and others, 1994 #3594 Youngest offset bedrock may be Miocene (Brown and Thayer, 1966 #3577) or Pliocene (Walker and MacLeod, 1991 #3646) in age.
Historic earthquake	
Most recent prehistoric deformation	latest Quaternary (<15 ka) *Comments:* Simpson and others (1993 #3596) used the prominent geomorphic expression of the fault trace to infer late Quaternary movement along the King Mountain fault; the other faults show little evidence of late Quaternary displacem (Simpson and others, 1993 #3596; Knudsen and others, 1994 #3594). Geomatrix Consultants Inc. (1995 #3593) mapped the King Mountain fault as active in the n and late Quaternary (<780 ka); Weldon and others (2002 #5648) mapped the King Mountain fault as active in the latest Quaternary (<18 ka), and the other faults as in the Quaternary (<1.6 Ma). Wong and others (1999 #5654) considered the King Mountain fault to be possibly active and assigned 0.5 probability based on equivo evidence for Quaternary displacement. Herein we use the most recent age classifications of Weldon and others (2002 #5648) to infer latest Quaternary displacement on the King Mountain fault and Quaternary displacement on the res the faults near Unity Valley.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* No published slip rates are available for any faults near Unity Valley, the poor geomorphic expression and lack of scarps in Quaternary deposits sugges

	rates of Quaternary slip.
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
References	#3577 Brown, E.C., and Thayer, T.P., 1966, Geologic map of the Canyon City quadrangle northeastern Oregon: U.S. Geological Survey Miscellaneous Geologi Investigations I-447, 1 sheet, scale 1:250,000. #3593 Geomatrix Consultants, Inc., 1995, Seismic design mapping, State of Oreg Technical report to Oregon Department of Transportation, Salem, Oregon, under Contract 11688, January 1995, unpaginated, 5 pls., scale 1:1,250,000. #3529 Knudsen, K.L., Simpson, G.D., Sawyer, T.L., Wong, I.G., Bott, J.D., and I W.R., 1996, Late Quaternary faulting and seismotectonics of east-central Oregon west-central Idaho: Geological Society of America Abstracts with Programs, v. 2 5, p. 82. #3594 Knudsen, K.L., Wong, I.G., Bott, J.D.J., Weber, G.E., Silva, W.J., and Lett W.R., 1994, Seismotectonic evaluation, Agency Valley and Bully Creek Dams, V Project, east-central Oregon: Draft Report prepared for U.S. Department of the In Bureau of Reclamation, 171 p., 4 pls. #3506 Lawrence, R.D., 1976, Strike-slip faulting terminates the Basin and Range province in Oregon: Geological Society of America Bulletin, v. 87, p. 846-850. #3535 Mann, G.M., and Meyer, C.E., 1993, Late Cenozoic structure and correlati seismicity along the Olympic-Wallowa Lineament, northwest United States: Geological Society of America Bulletin, v. 105, p. 853–871. #3544 Pezzopane, S.K., 1993, Active faults and earthquake ground motions in Or Eugene, Oregon, University of Oregon, unpublished Ph.D. dissertation, 208 p. #149 Pezzopane, S.K., and Weldon, R.J., II, 1993, Tectonic role of active faulting central Oregon: Tectonics, v. 12, p. 1140-1169. #7802 Reef, J.W., 1983, The Unity Reservoir rhyodacite tuff-breccia and associat volcanic rocks, Baker County, Oregon: Pullman, Washington State University, unpublished Master"s thesis, 128 p., scale 1:24,000. #7803 Robyn, T.L., 1977, Geology and petrology of the Strawberry Volcanics, N Oregon: Eugene, University of Oregon, unpublished Ph.D. dissertation, 224 p., sc 1:24,000. #3781 Robyn, T.L., and Hoover, J.D., 1982, Late Cenozoic deformation and volc

	in the Blue Mountains of central Oregon—Microplate interactions?: Geology, v. 572-576. #3596 Simpson, G.D., Hemphill-Haley, M.A., Wong, I.G., Bott, J.D.J., Silva, W.J. Lettis, W.R., 1993, Seismotectonic evaluation, Burnt River Project Unity Dam, B Project Thief Valley Dam, northeastern Oregon: Final Report prepared for U.S. Department of the Interior, Bureau of Reclamation, 167 p., 2 pls. #3782 Thayer, T.P., and Brown, C.E., 1973, Ironside Mountain, Oregon—A late Tertiary volcanic and structural enigma: Geological Society of America Bulletin, p. 489-498. #3646 Walker, G.W., and MacLeod, N.S., 1991, Geologic map of Oregon: U.S. Geological Survey, Special Geologic Map, 2 sheets, scale 1:500,000. #5648 Weldon, R.J., Fletcher, D.K., Weldon, E.M., Scharer, K.M., and McCrory, 2002, An update of Quaternary faults of central and eastern Oregon: U.S. Geolog Survey Open-File Report 02-301 (CD-ROM), 26 sheets, scale 1:100,000. #5654 Wong, I., Dober, M., Hemphill-Haley, M., Naugler, W., Silva, W.J., and Li 1999, Probabilistic seismic hazard analysis and safety evaluation earthquake grou motions—Bully Creek Dam, Vale Project, eastern Oregon: U.S. Department of th Interior, Bureau of Reclamation Technical Memorandum D8330-99-28. #4042 Wood, S.H., 1999, Quaternary faulting in southwest Idaho and adjacent Or *in* Quaternary geology of the northern Quinn River and Alvord Valleys, southeast Oregon: Friends of the Pleistocene field trip guide, September 24-26, 1999, Appe 9, p. 1-5.