

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](#).

Waldo Hills fault (Class A) No. 872

Last Review Date: 2002-04-09

citation for this record: Personius, S.F., compiler, 2002, Fault number 872, Waldo Hills 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 03:14 PM.

Synopsis	The northeast-striking, southeast-dipping Waldo Hills reverse fault offsets Mioce rocks of the Columbia River Basalt Group along the northwestern margin of the Waldo Hills in the central Willamette Valley. The Waldo Hills fault is coincident with a linear range front that marks the northwestern margin of the Waldo Hills and the eastern margin of the central Willamette Valley, but no fault scarps on surficial Quaternary deposits have been described along its trace.
Name comments	The Waldo Hills or Waldo Hills Range Front fault was mapped and named by Gr (1990 #3990), Yeats and others (1993 #5057), Yeats and Levi (1994 #4024), and and others (1996 #4291). The fault is not shown on most previously published ge maps of the area (Hampton, 1972 #4065; Walker and Duncan, 1989 #3581), but i represented on more recent maps (Tolan and Beeson, 2000 #5069). Fault ID: This is fault number 32 of Geomatrix Consultants, Inc. (1995 #3593).
County(s) and	MARION COUNTY, OREGON

State(s)	MARION COUNTY, OREGON
Physiographic province(s)	PACIFIC BORDER
Reliability of location	Good Compiled at 1:24,000 scale. <i>Comments:</i> Location of fault from ORActiveFaults (http://www.oregongeology.org/arcgis/rest/services/Public/ORActiveFaults/MapServer downloaded 06/02/2016) attributed to 1:24,000-scale mapping of Tolan and Beeson (2000 #5069).
Geologic setting	The Waldo Hills fault offsets Miocene rocks of the Columbia River Basalt Group forms an aeromagnetic anomaly along the steep, linear northwestern margin of the Waldo Hills in the northern Willamette Valley (Yeats and others, 1993 #5057; Crenna and Yeats, 1994 #4129; Yeats and others, 1996 #4291; Blakely and others, 2000 #4333; Tolan and Beeson, 2000 #5069).
Length (km)	12 km.
Average strike	N45°E
Sense of movement	Normal <i>Comments:</i> The Waldo Hills fault is mapped as a high-angle normal (?) fault by Yeats and others (1993 #5057), Yeats and Levi (1994 #4024), Crenna and others (1994 #4129), Yeats and others (1996 #4291), and Tolan and Beeson (2000 #5069).
Dip Direction	NW <i>Comments:</i> Dip estimate of >60° is from Yeats and others (1993 #5057) and Crenna and others (1994 #4129) and assumes that the fault dips NW.
Paleoseismology studies	
Geomorphic expression	The Waldo Hills fault is coincident with a steep, linear range front that marks the northwestern margin of the Waldo Hills and the eastern margin of the central Willamette Valley. However, extensive degradation and the sinuosity of the Waldo Hills range front suggests low rates of fault activity (Yeats and others, 1993 #5057; Crenna and Yeats, 1994 #4129). No fault scarps on surficial Quaternary deposits have been described along the Waldo Hills fault.
Age of faulted surficial	The steep, linear range front that marks the trace of the Waldo Hills fault suggests the fault may deform older Quaternary deposits along the northwestern margin of

deposits	Waldo Hills, but the but the fault does not appear to deform middle or late Quaternary deposits such as the Linn gravel (Rowland Formation), and the Dolph and Winkle geomorphic surfaces (Yeats and others, 1991 #3953; Yeats and others, 1993 #505; Yeats and Levi, 1994 #4024; Crenna and Yeats, 1994 #4129; Yeats and others, 1994 #4291).
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) <i>Comments:</i> Geomatrix Consultants, Inc. (1995 #3593), and Madin and Mabey (1995 #3575) inferred middle and late Quaternary (<780 ka) displacement, but given the equivocal nature of evidence for Quaternary displacement, the Waldo Hills fault is mapped herein as Quaternary (<1.6 Ma).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> Yeats and others (1993 #5057) and Crenna and others (1994 #4129) estimated >90 m and Yeats and others (1996 #4291) estimate a minimum of 50 m vertical offset of Miocene Columbia River Basalt Group rocks across the Waldo Hills fault; these data suggest low rates of slip. Geomatrix Consultants, Inc. (1995 #3593) and Wong and others (1999 #4073; 2000 #5137) assigned slip rates of 0.005–0.02 mm/yr in their analyses of the earthquake hazards associated with the Waldo Hills fault.
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
References	#4333 Blakely, R.J., Wells, R.E., Tolan, T.L., Beeson, M.H., Trehu, A.M., and Lill, L.M., 2000, New aeromagnetic data reveal large strike-slip (?) faults in the northern Willamette Valley, Oregon: Geological Society of America Bulletin, v. 112, p. 1212-1233. #4129 Crenna, P.A., and Yeats, R.S., 1994, Late Cenozoic tectonics and paleogeography of the Salem metropolitan area, central Willamette Valley, Oregon: Oregon Geology, v. 56, no. 6, p. 129-136. #3593 Geomatrix Consultants, Inc., 1995, Seismic design mapping, State of Oregon. Technical report to Oregon Department of Transportation, Salem, Oregon, under Contract 11688, January 1995, unpaginated, 5 pls., scale 1:1,250,000. #3990 Graven, E.P., 1990, Structure and tectonics of the southern Willamette Valley, Oregon: Oregon State University, unpublished M.S. thesis, 119 p., 10 pls.

#4065 Hampton, E.R., 1972, Geology and ground water of the Molalla-Salem Slc Area, northern Willamette Valley, Oregon: U.S. Geological Survey Water-Supply Paper 1997, 79 p., 3 pls., scale 1:48,000.

#3575 Madin, I.P., and Mabey, M.A., 1996, Earthquake hazard maps for Oregon: of Oregon, Department of Geology and Mineral Industries Geological Map Series: GMS-100, 1 sheet.

#5069 Tolan, T.L., and Beeson, M.H., 2000, Geologic map of the Turner 7.5 mini quadrangle: U.S. Geological Survey Open-File Report 00-351, 1 sheet, scale 1:24

#3581 Walker, G.W., and Duncan, R.A., 1989, Geologic map of the Salem 1 by 2 quadrangle, western Oregon: U.S. Geological Survey Miscellaneous Investigation Map I-1893, 1 sheet, scale 1:250,000.

#4073 Wong, I., Silva, W., Bott, J., Wright, D., Thomas, P., Gregor, N., Li, S., Mæ M., Sojourner, A., and Wang, Y., 1999, Earthquake scenario and probabilistic gro shaking maps for the Portland, Oregon metropolitan area: Technical report to U.S Geological Survey, under Contract 1434-HQ-96-GR-02727, 16 p., 12 pls.

#5137 Wong, I., Silva, W., Bott, J., Wright, D., Thomas, P., Gregor, N., Li, S., Mæ M., Sojourner, A., and Wang, Y., 2000, Earthquake scenario and probabilistic gro shaking maps for the Portland, Oregon, metropolitan area: State of Oregon, Department of Geology and Mineral Industries Interpretive Map Series IMS-16, pamphlet, scale 1:62,500.

#4024 Yeats, R.S., and Levi, S., 1994, Active faults and folds in the Salem metropolitan area, Oregon: U.S. Geological Survey Open-File Report 94-176.

#3953 Yeats, R.S., Graven, E.P., Werner, K.S., Goldfinger, C., and Popowski, T., Tectonics of the Willamette Valley, Oregon: U.S. Geological Survey Open-File R 91-441-P, 47 p., 3 pls.

#4291 Yeats, R.S., Graven, E.P., Werner, K.S., Goldfinger, C., and Popowski, T.A 1996, Tectonics of the Willamette Valley, Oregon, *in* Rogers, A.M., Walsh, T.J., Kockelman, W.J., and Priest, G.R., eds., Assessing earthquake hazards and reduc risk in the Pacific Northwest: U.S. Geological Survey Professional Paper 1560, v. 183-222.

#5057 Yeats, R.S., Levi, S., and Crenna, P., 1993, Active faults and folds in the S metropolitan area, Oregon: Technical report to U.S. Geological Survey, Reston, Virginia, under Contract 14-08-0001-G2131, August 14, 1993, 22 p.

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