

# 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](#).

## Clackamas River fault zone (Class A) No. 864

Last Review Date: 2016-05-06

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<b>Synopsis</b>	The Clackamas River fault zone is a broad zone of mostly northwest-striking normal and right-lateral strike-slip faults that offset early Pleistocene, Pliocene, and Miocene volcanic rocks in the Cascade Range of northern Oregon. No evidence of fault scarps on Quaternary deposits has been described. These faults are part of a regional structural zone that controlled the distribution of Columbia River Basalt Group lava flows in western Oregon, and may form a link between similarly striking Brothers or Sisters fault zones to the southeast and the Portland Hills fault zone to the northwest.
<b>Name comments</b>	The fault zone includes a group of northwest-striking faults mapped as the Clackamas fault zone by U.S. Army Corps of Engineers (1983 #3485), as the Clackamas River fault zone by Priest and others (1982 #4083; 1983 #4055), Pezzopane (1993 #3544) and Pezzopane and Weldon (1993 #149), and as the

	<p>Clackamas River fault zone, the Oak Grove-Lake Harriet fault zone, and the Peavine Mountain fault by Geomatrix Consultants, Inc. (1990 #3550; 1995 #3593). The fault zone also includes the Canyon Creek and Lake Harriet faults of Anderson (1978 #3973). All of these faults are part of the Portland Hills-Clackamas River structural zone of Beeson and others (1985 #4022; 1989 #4023).</p> <p><b>Fault ID:</b> This fault zone is fault number 5 of Pezzopane (1993 #3544) and fault numbers 41 and 42 of Geomatrix Consultants, Inc. (1995 #3593).</p>
<b>County(s) and State(s)</b>	CLACKAMAS COUNTY, OREGON MARION COUNTY, OREGON
<b>Physiographic province(s)</b>	CASCADE-SIERRA MOUNTAINS
<b>Reliability of location</b>	<p>Good Compiled at 1:100,000 scale.</p> <p><i>Comments:</i> All published maps of the area show slightly different fault patterns, so the fault traces used herein are from the 1:100,000-scale compilation of Weldon and others (2002 #5648).</p>
<b>Geologic setting</b>	<p>The Clackamas River fault zone consists of numerous northwest-striking normal and right-lateral strike-slip faults offsetting Miocene through early Quaternary volcanic rocks in the Cascade Range of northern Oregon (Anderson, 1978 #3973; White, 1980 #4082; Hammond and others, 1980 #4096; Hammond and others, 1982 #4124; MacLeod and Sherrod, 1988 #3770; Sherrod and Smith, 1989 #3498; Walker and Duncan, 1989 #3581; Beeson and others, 1989 #4023; Walker and MacLeod, 1991 #3646; Sherrod and Scott, 1995 #3495). These faults are part of a regional structural zone that controlled the distribution of Columbia River Basalt Group lava flows in western Oregon (Beeson and others, 1985 #4022; Beeson and others, 1989 #4023). The northwest strikes of these faults may indicate a linkage between the similarly striking Brothers or Sisters fault zones to the southeast and the Portland Hills fault zone to the northwest (Anderson, 1978 #3973; Hammond and others, 1980 #4096; Hammond and others, 1982 #4124; MacLeod and Sherrod, 1988 #3770; Sherrod and Smith, 1989 #3498; Beeson and others, 1989 #4023).</p>
<b>Length (km)</b>	29 km.
<b>Average strike</b>	N19°W

<p><b>Sense of movement</b></p>	<p>Normal, Right lateral</p> <p><i>Comments:</i> The numerous fault strands in the Clackamas River fault zone are mapped as high angle faults with normal and right-lateral senses of slip (Anderson, 1978 #3973; Hammond and others, 1982 #4124; U.S. Army Corps of Engineers, 1983 #3485; Beeson and others, 1985 #4022; Sherrod and Smith, 1989 #3498; Walker and Duncan, 1989 #3581; Beeson and others, 1989 #4023; Walker and MacLeod, 1991 #3646; Pezzopane, 1993 #3544; Sherrod and Scott, 1995 #3495). Anderson (1978 #3973) described horizontal slickensides on some faults in this zone.</p>
<p><b>Dip Direction</b></p>	<p>W; E; V</p> <p><i>Comments:</i> The U.S. Army Corps of Engineers (1983 #3485) described an exposure of one fault in the zone that dipped 74° to the southwest. Anderson (1978 #3973) and Beeson and others (1985 #4022; 1989 #4023) describe nearly vertical to vertical dips on these faults. Geomatrix Consultants, Inc. (1995 #3593) use an estimated dip of 70° in their model of earthquake hazards associated with the Clackamas River and Oak Grove-Lake Harriet fault zones.</p>
<p><b>Paleoseismology studies</b></p>	
<p><b>Geomorphic expression</b></p>	<p>The Clackamas River fault zone is comprised of numerous northwest-striking normal and strike-slip faults that form gentle to steep escarpments on Neogene volcanic rocks. A few of these faults are mapped in lower Pleistocene (?) volcanic rocks (Anderson, 1978 #3973; Hammond and others, 1982 #4124), but only a single fault scarp, an eroded scarp on a down-to-the-southwest normal fault located west of Rhododendron Ridge, has been described (Geomatrix Consultants Inc., 1990 #3550). U.S. Army Corps of Engineers (1983 #3485) shows numerous northwest-trending lineaments along many traces in the fault zone. Weldon and others (2002 #5648) mapped lineaments that cross Quaternary deposits on 1:100,000-scale DEMs of the area.</p>
<p><b>Age of faulted surficial deposits</b></p>	<p>Faults in the Clackamas River fault zone offset Neogene volcanic rocks, some of which may be early Pleistocene in age (Anderson, 1978 #3973; Hammond and others, 1982 #4124; Sherrod and Smith, 1989 #3498; Walker and Duncan, 1989 #3581; Walker and MacLeod, 1991 #3646; Sherrod and Scott, 1995 #3495). No</p>

	offsets of Quaternary deposits have been described.
<b>Historic earthquake</b>	
<b>Most recent prehistoric deformation</b>	undifferentiated Quaternary (<1.6 Ma)  <i>Comments:</i> The U.S. Army Corps of Engineers (1983 #3485) map some faults in the Clackamas River fault zone as early Quaternary (0.5–2.0 Ma), and Pezzopane (1993 #3544) and Weldon and others (2002 #5648) mapped all faults in the zone as active in the Quaternary (<1.6 Ma). Geomatrix Consultants, Inc. (1995 #3593) classified these faults as active in the middle and late Quaternary (<780 ka), but herein we follow the most-recent compilation of Weldon and others (2002 #5648) and classify the faults as Quaternary (<1.6 Ma) until further studies are conducted.
<b>Recurrence interval</b>	
<b>Slip-rate category</b>	Less than 0.2 mm/yr  <i>Comments:</i> Anderson (1978 #3973) and Beeson and others (1989 #4023) describe stratigraphic offsets of less than 5 m to greater than 150 m; such data yield low long-term rates of slip. Geomatrix Consultants, Inc. (1995 #3593) used estimated slip rates of 0.05–0.2 mm/yr in their analysis of earthquake hazards associated with this fault zone.
<b>Date and Compiler(s)</b>	2002 Stephen F. Personius, U.S. Geological Survey
<b>References</b>	#3973 Anderson, J.L., 1978, The stratigraphy and structure of the Columbia River Basalt in the Clackamas River drainage: Portland, Oregon, Portland State University, unpublished M.S. thesis, 136 p.  #4022 Beeson, M.H., Fecht, K.R., Reidel, S.P., and Tolan, T.L., 1985, Regional correlations within the Frenchman Springs member of the Columbia River Basalt Group—New insights into the middle Miocene tectonics of northwestern Oregon: <i>Oregon Geology</i> , v. 47, no. 8, p. 87-96.  #4023 Beeson, M.H., Tolan, T.L., and Anderson, J.L., 1989, The Columbia River Basalt Group in western Oregon-Geologic structures and other factors that controlled flow emplacement patterns, <i>in</i> Reidel, S.P., and Hooper, P.R., eds., <i>Volcanism and</i>

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#3495 Sherrod, D.R., and Scott, W.E., 1995, Preliminary geologic map of the Mount Hood 30 by 60 minute quadrangle, northern Cascade Range, Oregon: U.S. Geological Survey Open-File Report 95-219, 28 p., 1 pl., scale 1:100,000.

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