

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](#).

White Branch fault zone (Class A) No. 1809

Last Review Date: 2016-05-02

citation for this record: Personius, S.F., compiler, 2002, Fault number 1809, White Branch fault zone, 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 02:25 PM.

Synopsis

The White Branch fault zone, first documented in the early 2000s, forms the southern part of the Horse Creek fault zone, a regional normal fault zone that forms the western margin of the High Cascades graben, a 30-km-wide structure that bounds the young volcanoes of the central Oregon High Cascades. The White Branch fault zone forms a younger graben within an older graben-margin fault that lies to the west. The fault zone consists of many en echelon strands that are mapped as juxtaposing upper Pliocene to middle Pleistocene basalt against middle Pleistocene to Holocene basalt. Individual faults have offsets of 50-100 m, and some faults are marked by lavas that thicken considerably on the downthrown side, indicating ponding against pre-existing scarps. The youngest faulted rocks are thought to be early Bruhnes age (<0.78 Ma), so the time of most-recent faulting herein is assumed to be middle and late Quaternary (<750 ka).

Name comments	This fault zone was mapped by Sherrod and others (2004 #5172) and named by Conrey and others (2002 #5168) after fault exposures along the White Branch of the McKenzie River in the central Oregon Cascades. These faults form the southern part of the Horse Creek fault zone (Sherrod and others, 2004 #5172).
County(s) and State(s)	LANE COUNTY, OREGON
Physiographic province(s)	CASCADE-SIERRA MOUNTAINS
Reliability of location	Good Compiled at 1:100,000 scale. <i>Comments:</i> Fault traces are from 1:100,000-scale mapping of Sherrod and others 2004 #5172).
Geologic setting	The recently discovered White Branch fault zone forms the southern part of the Horse Creek fault zone, a regional normal fault zone that forms the western margin of the High Cascades graben, a 30-km-wide structure that bounds the young volcanoes of the central Oregon High Cascades (Sherrod and others, 2004 #5172). Conrey and others (2002 #5168) describe the White Branch fault zone as a younger graben within an older graben-margin fault that lies to the west. This fault zone is not shown on most geologic maps (Walker and MacLeod, 1991 #3646; Sherrod and Smith, 2000 #5165) or included in Quaternary fault compilations (Pezzopane, 1993 #3544; Geomatrix Consultants Inc., 1995 #3593; Madin and Mabey, 1996 #3575; Weldon and others, 2002 #5648) of the area.
Length (km)	18 km.
Average strike	N6°E
Sense of movement	Normal <i>Comments:</i> These faults are mapped as normal or high-angle faults by Conrey and others (2002 #5168) and Sherrod and others (2004 #5172).
Dip Direction	E
Paleoseismology studies	

Geomorphic expression	These faults were delineated by mapping the Matuyama-Bruhnes paleomagnetic contact with a fluxgate magnetometer (Conrey and others, 2002 #5168), rather than by mapping prominent fault scarps. The fault zone consists of many en echelon strands with individual offsets of 50-100 m. Some faults are marked by lavas that thicken considerably on the downthrown side, which probably indicates ponding against pre-existing scarps (Conrey and others, 2002 #5168).
Age of faulted surficial deposits	Sherrod and others (2004 #5172) map the fault zone as juxtaposing undifferentiated older (upper Pliocene to middle Pleistocene) basalt (QTb) against undifferentiated younger (middle Pleistocene to Holocene) basalt (Qb). The youngest faulted rocks are thought to be early Bruhnes (<0.78 Ma) in age (Conrey and others, 2002 #5168).
Historic earthquake	
Most recent prehistoric deformation	middle and late Quaternary (<750 ka) <i>Comments:</i> Sherrod and others (2004 #5172) map the fault zone as juxtaposing undifferentiated older (upper Pliocene to middle Pleistocene) basalt (QTb) against undifferentiated younger (middle Pleistocene to Holocene) basalt (Qb). The youngest faulted rocks are thought to be early Bruhnes age (<0.78 Ma), so the time of most-recent faulting herein is assumed to be middle and late Quaternary (<750 ka).
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr <i>Comments:</i> Poor geomorphic expression and individual offsets of 50–100 m in middle Pleistocene rocks (Conrey and others, 2002 #5168) suggest low rates of long-term slip.
Date and Compiler(s)	2002 Stephen F. Personius, U.S. Geological Survey
References	#5168 Conrey, R.M., Taylor, E.M., Donnelly-Nolan, J.M., and Sherrod, D.R., 2002, North-central Oregon Cascades—Exploring petrologic and tectonic intimacy in a propagating intra-arc rift, <i>in</i> Moore, G.W., ed., Field guide to geologic processes in Cascadia: State of Oregon, Department of Geology and Mineral Industries

Special Paper 36, p. 47-90.

#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.

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

#3544 Pezzopane, S.K., 1993, Active faults and earthquake ground motions in Oregon: Eugene, Oregon, University of Oregon, unpublished Ph.D. dissertation, 208 p.

#5165 Sherrod, D.R., and Smith, J.G., 2000, Geologic map of upper Eocene to Holocene volcanic and related rocks of the Cascade Range, Oregon: U.S. Geological Survey Geologic Investigations Map I-2569, 2 sheets, scale 1:500,000.

#5172 Sherrod, D.R., Taylor, E.M., Ferns, M.L., Scott, W.E., Conrey, R.M., and Smith, G.A., 2004, Geologic map of the Bend 30' x 60' quadrangle, central Oregon: U.S. Geological Survey Geologic Investigations Map I-2683, 44 p. pamphlet, 2 sheets, scale 1:100,000.

#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, P.A., 2002, An update of Quaternary faults of central and eastern Oregon: U.S. Geological Survey Open-File Report 02-301 (CD-ROM), 26 sheets, scale 1:100,000.

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