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Quaternary Fault and Fold Database of the United States

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Faults near The Dalles (Class A) No. 580

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Synopsis	Faults near The Dalles in northern Oregon and southern Washington are northwest-striking, right-lateral strike-slip and minor normal faults. These faults offset Miocene and Pliocene volcanic and sedimentary rocks near the southern margin of the Yakima fold belt. No scarps on Quaternary deposits have been described, but one of these faults may offset Quaternary basalt and these faults form prominent regional lineaments that also suggest they may have undergone Quaternary displacement.
Name comments	Several northwest-striking faults have been mapped by various authors near The Dalles in southern Washington and northern Oregon (Beaulieu, 1977 #3726; Swanson and others, 1981 #3496; Bela, 1982 #3584; U.S. Army Corps of Engineers, 1983 #3480; Anderson, 1987 #3492; Walsh and others, 1987 #3579; Tolan and Reidel, 1989 #3765; Pezzopane, 1993 #3544; Geomatrix Consultants Inc., 1995 #3593). Two of these faults are named.

	The Warwick fault is the easternmost fault included in this group, and the two westernmost faults are part of the Little White Salmon River fault zone (Bela, 1982 #3584; Anderson, 1987 #3492; Tolan and Reidel, 1989 #3765). Northwest-striking faults near the Dalles extend southeast from the vicinity of the southeastern margin of Camas Prairie, Washington to the Columbia River, and extend short distances (<15 km) farther southeast into Oregon.
County(s) and State(s)	WASCO COUNTY, OREGON HOOD RIVER COUNTY, OREGON SHERMAN COUNTY, OREGON KLICKITAT COUNTY, WASHINGTON SKAMANIA COUNTY, WASHINGTON
Physiographic province(s)	COLUMBIA PLATEAU CASCADE-SIERRA MOUNTAINS
Reliability of location	Good Compiled at 1:100,000 scale. *Comments:* Fault traces are from 1:100,000-scale compilations of Korosec (1987 #4658) and Weldon and others (2002 #5648).
Geologic setting	Faults near The Dalles are northwest-trending, right-lateral strike-slip and minor normal faults formed in Miocene Columbia River basalts and Miocene and Pliocene sedimentary rocks near the southern margin of the Yakima fold belt (Beaulieu, 1977 #3726; Swanson and others, 1981 #3496; Bela, 1982 #3584; Anderson, 1987 #3492; Walsh and others, 1987 #3579; Tolan and Reidel, 1989 #3765; Walker and MacLeod, 1991 #3646). The Yakima fold belt, a structural-tectonic sub province of the western Columbia Plateaus Province, consists of a series of generally east-trending narrow asymmetrical anticlinal ridges and broad synclinal valleys formed by folding of Miocene Columbia River Basalt flows and sediments (Reidel and others, 1989 #5553; 1994 #3539). Anticlinal ridges of the Yakima fold belt began to grow in Miocene time (about 16-17 Ma), concurrent with eruptions of Columbia River Basalt flows, and continued during Pliocene time and may have continued to the present (Reidel and others, 1989 #5553; 1994 #3539). The northwest-striking faults near the Dalles and several other northwest-striking faults in this region, appear to cut east-trending folds and faults of the Columbia Hills structures [#568]. Several studies have reported that these northwest-striking faults are at least in part younger features that cut and offset easterly trending, Yakima fold belt structures such

	as those of the Columbia Hills (Myers and others, 1979 #5175; Bentley and others, 1980 #4667; Geomatrix Consultants Inc., 1995 #3593).
Length (km)	69 km.
Average strike	N38°W
Sense of movement	Right lateral, Normal *Comments:* Northwest-striking structures near The Dalles are mapped as right-lateral strike-slip faults (Anderson, 1987 #3492; Pezzopane, 1993 #3544), although some of these faults were mapped as normal faults in earlier compilations (Swanson and others, 1981 #3496; Bela, 1982 #3584; Walsh and others, 1987 #3579).
Dip Direction	V *Comments:* No dip measurements have been published, but these faults have very straight map traces that are suggestive of near-vertical dips.
Paleoseismology studies	
Geomorphic expression	No data on the geomorphic expression of these faults has been published, but they form prominent lineaments in the landscape that may suggest some Quaternary displacement.
Age of faulted surficial deposits	Faults near The Dalles offset Miocene and Pliocene volcanic and volcaniclastic sedimentary rocks (Beaulieu, 1977 #3726; Swanson and others, 1981 #3496; Bela, 1982 #3584; Walsh and others, 1987 #3579; Korosec, 1987 #4658; Walker and MacLeod, 1991 #3646). Anderson (1987 #3492) described possible faulting of 0.84 Ma intracanyon basalt flows across the Warwick fault; no other details of offset Quaternary deposits have been published.
Historic earthquake	
Most recent prehistoric deformation	undifferentiated Quaternary (<1.6 Ma) *Comments:* No evidence of Quaternary displacement has been described along faults near The Dalles in Oregon, but in Washington, Anderson (1987 #3492) described possible faulting

	of 0.84 Ma intracanyon basalt flows across the Warwick fault. U.S. Army Corps of Engineers (1983 #3480) used regional structural relationships to infer early Quaternary (0.5–2.0 Ma) displacement on some of these faults in Washington. Geomatrix Consultants, Inc. (1990 #3550) inferred that most faults near The Dalles were not active. Pezzopane (1993 #3544) and two subsequent compilations (Geomatrix Consultants Inc., 1995 #3593; Madin and Mabey, 1996 #3575) classified these and several other faults with similar trend in the area as active in the Quaternary (<1.6–1.8 Ma). In a more recent compilation, Weldon and others (2002 #5648) assigned Quaternary (<1.6 Ma) ages to four faults in this area. The mapping of Weldon and others (2002 #5648) is used herein until further studies are conducted.
Recurrence interval	
Slip-rate category	Less than 0.2 mm/yr *Comments:* No slip data in Quaternary deposits are available for the faults near The Dalles. The lack of unequivocal evidence of faulting in Quaternary deposits suggests low rates of Quaternary slip.
Date and Compiler(s)	2003 Stephen F. Personius, U.S. Geological Survey David J. Lidke, U.S. Geological Survey
References	#3492 Anderson, J.L., 1987, The structural geology and ages of deformation of a portion of the southwest Columbia Plateau, Washington and Oregon: University of Southern California, Ph. D dissertation, 283 p., 7 pls., scale 1:24,000. #3726 Beaulieu, J.D., 1977, Geologic hazards of parts of northern Hood River, Wasco, and Sherman Counties, Oregon: State of Oregon, Department of Geology and Mineral Industries Bulletin 91, 95 p., 11 pls., scale 1:125,000. #3584 Bela, J.L., 1982, Geologic and neotectonic evaluation of north-central Oregon—The Dallas 1 x 2 quadrangle: State of Oregon, Department of Geology and Mineral Industries Geologic Map Series GMS-27, 2 sheets, scale 1:250,000. #4667 Bentley, R.D., Powell, J., Anderson, J.L., and Farooqui, S.M., 1980, Geometry and tectonic evolution of the Columbia

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